

Berryessa Creek Project

Santa Clara County

Appendix A: Environmental

Part I

Wetland Delineation Report



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846



In reply refer to:

APR 26 2005

RECEIVED

APR 27 2005

Mr. Mark C. Charlton
Chief, Planning Division
Corps of Engineers, Sacramento District
1325 J Street
Sacramento, California 95825-2922

Dear Mr. Charlton:

Enclosed is the Fish and Wildlife Service's draft Wetland Delineation Report for the General Re-evaluation of Flood Control Needs along Berryessa Creek. We are providing this report for the Corps of Engineers' (Corps) review and comment prior to transmittal of the final report.

If you have any questions regarding the draft report please contact either Mark Littlefield or Doug Weinrich at (916) 414-6600.

Sincerely,

David L. Harlow
Acting Field Supervisor

cc:

David Bauman, COE, Sacramento, California

**Wetland Delineation Report
for
Santa Clara Valley Water District
and
U.S. Army Corps of Engineers
General Re-Evaluation of Flood Control Needs
Along Berryessa Creek**

**Prepared for:
U.S. Army Corps of Engineers
Sacramento District**

**Prepared by:
U.S. Department of the Interior
Fish and Wildlife Service
Sacramento Fish and Wildlife Office**

April 2005

Introduction

The U.S. Army Corps of Engineers (Corps) regulates impacts to waters of the United States under the jurisdictional authority of section 404 of the Clean Water Act (33 U.S.C. 404 et seq.). Jurisdictional waters of the United States include all navigable waters, interstate waters, their tributaries, and adjacent wetlands (Environmental Laboratory 1987; Federal Register 1986).

The purpose of this report is to describe the extent and type of jurisdictional wetlands and other waters of the United States present within the proposed project site that fall under the jurisdiction of section 404 of the Clean Water Act. Accordingly, this report addresses all identified potential jurisdictional waters of the United States, including wetlands, for the general re-evaluation of flood control needs along Berryessa Creek (project), located in the cities of Milpitas and San Jose, Santa Clara County, California. Appendix 1 provides project vicinity and location maps. This report is based on information gathered in the field, the *1987 U.S. Army Corps of Engineers (Corps) Wetland Delineation Manual*, and Federal regulations governing wetland areas.

Definitions and Criteria

Wetlands. For regulatory purposes, wetlands are a subgroup of waters of the United States defined as areas that are inundated, or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3; 40 CFR 230.3).

Waters of the United States. As used in this report, this term refers to unvegetated waterways and water bodies with a defined bed and bank and an ordinary high water mark, such as drainages, creeks, rivers and lakes. Waters of the United States typically lack hydrophytic vegetation and may also lack hydric soils.

Other Waters of the United States. As used in this report, this term refers to vegetated waterways and water bodies with a defined bed and bank and an ordinary high water mark, such as vegetated swales, drainages, creeks. Other waters of the United States typically contain hydrophytic vegetation and hydric soils, and as such are wetlands in addition to being waters of the United States.

Summary of Findings

The project area supports areas of non-jurisdictional uplands, about 8 acres of waters of the United States and about 0.79 acre of other waters of the United States. Other waters of the United States include limited areas of freshwater marsh typically located at or below the ordinary high water line and within boundaries of the stream channel. Waters of the United States includes all portions of Berryessa Creek within the project boundary, at or below the ordinary high water line. Upland areas include areas lacking indicators of wetland vegetation and/or hydrology, such as riparian woodlands, annual grasslands, levee and/or maintenance roads, and disturbed areas.

Project Area and Description

Berryessa Creek is located in the south San Francisco Bay Area of California, in Santa Clara County and is a tributary to Lower Penitencia Creek and Coyote Creek, which ultimately flow into the southern end of San Francisco Bay. Berryessa Creek watershed is about 22 square miles, draining the east side of Santa Clara Valley. Appendix 1 provides a project vicinity and location maps.

The headwaters of Berryessa Creek are located in the Los Buellis Hills of the Diablo Range. Once the creek leaves the foothills of the Diablo Range, it flows through the cities of San Jose and Milpitas, California, eventually making its way to San Francisco Bay. Previous flood control efforts and adjacent development have significantly altered Berryessa Creek. Levees and concrete-lined portions of the stream channel have resulted in significant modification and channelization. Portions of the creek flow through culverts and gradient is controlled by several engineered drop structures. Berryessa Creek is identified as an intermittent blue line water on the U.S. Geological Survey topographic map for the area. Berryessa Creek flows throughout its length during the rainy season, especially after heavy rainfalls. Portions of the creek may retain water throughout the year as a result of summer runoff from urban areas ("nuisance water").

The project area is subject to intense residential and commercial development. The project area encompasses a 4.5 mile length of Berryessa Creek, beginning at Old Piedmont Road and ending about 50 feet downstream of Calaveras Boulevard.

Methodology

Determination and delineation of wetlands and waters of the United States within the proposed project site was based on the delineation process for routine determinations as described in the *1987 U.S. Army Corps of Engineers Wetland Delineation Manual*.

The objective of the assessment was to gather information on the vegetation, soils, and hydrologic conditions of the project site and then determine the total acreage of areas potentially subject to the Corps' jurisdiction. Plant species were identified based on Reed (1988) and Hickman (1993) and then recorded as hydrophytic or upland based on classifications by Reed (1988). Soil colors were determined based on the Munsell soil color chart 1992. Soil taxonomy and drainage characteristics were determined based on the U.S. Department of Agriculture, Soil Conservation Service soil survey for Santa Clara County, California, completed in June 1958.

Field investigation procedures for the delineation were conducted on January 25-26, 2005, by U.S. Fish and Wildlife Service staff (see Appendix 2 for list of delineators and preparers). Data forms for each site are included in this report as Appendix 3.

Vegetation

The vegetation along the entire site was examined for the presence of wetland indicator species as listed in the *National List of Plant Species that Occur in Wetlands: California (Region 0)*. When more than 50 percent of the dominant species in a plant community

have an indicator status of obligate wetland, facultative wetland, and/or facultative, hydrophytic vegetation is determined to be present. A total of nine locations within the project site were closely examined during the assessment to identify and determine the plant species present and their composition. See Appendix 4 for a list of species common to the project site.

Hydrology

The entire length of Berryessa Creek within the project site was assessed for the presence of wetland hydrology. The term "wetland hydrology" encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Indicators of wetland hydrology may include, but are not limited to:

- Drift lines
- Sediment deposition
- Watermarks
- Historic records and
- Visual observations of saturated soils and/or inundation

Soils

Hydric soils require long periods (hundreds of years) for development of wetland soil characteristics, and most man-induced wetlands have not been in existence for a sufficiently long enough period to allow for their development. Because the likelihood of hydric soils being present within the constructed channel was minimal, standard soil profile test pits were not dug. Soil data was gathered along the length of the project site by the use of a soil probe/core. Soil color was noted at two locations where there was the presence of wetland hydrology and hydrophytic vegetation. Soils maps for the Santa Clara area were developed by the U.S. Department of Agriculture, Soil Conservation Service in June 1958. This soil survey and its attendant maps were reviewed prior to field visits.

Soil types in the project area include Mocho gravelly loam (1-3 percent slopes), Mocho loam (1-3 percent slopes), Mocho clay loam (1-3 percent slopes), Sunnyvale clay loam (0-1 percent slope), Orestimba silty clay loam (0-1 percent slope), and Clear Lake clay (adobe) (0-1 percent slope).

Conclusions

The project site contains waters of the United States and other waters of the United States. Other waters of the United States within the project site are characterized as riverine semipermanently flooded freshwater marsh. Natural flooding in the area occurs due to storm events during the winter months and runoff from urban areas during the summer months.

Other waters of the United States in the project area are dominated by cattail, an obligate wetland plant species as defined by the *National List of Plant Species that Occur in Wetlands: California (Region 0)*. Also common are watercress, horsetail, and

smartweed. The extent of area dominated by hydric vegetation within the project site appears to vary from year to year. This conclusion is based on review of aerial photography of the site and observations of weed control and maintenance within the flood control channel.

Soil in other waters of the United States was clayey with a Munsell moist color of very dark gray to black (2.5 Y 3-2/0). Soils in the project area as identified by the 1958 soil survey are not hydric. It should be noted that due to the age and mapping order of the soil survey, inclusions of other minor soil types would not have been routinely listed. Areas of freshwater marsh are atypical because the channel they are found in is man made, and the soils present are a result of recent deposition and sedimentation.

As previously noted within the project site, other waters of the United States are found at or below the ordinary high water line. This appears to be a result of the steep cross-section of the channel (trapezoidal) and the nature of the parent soil material exposed on the channel sides which limits growth of hydrophytic vegetation. Other waters of the United States are noted on Map # 7 as BW-1 and on Map #6 as BW-2. BW-1 totals about 0.40 acre and BW-2 totals about 0.39 acre. These two sites total about 0.79 acre. Field data sheets recording the vegetation, soils, and hydrology at each plot are attached as Appendix 3.

As tributary to a navigable water of the United States (San Francisco Bay) the area of Berryessa Creek at or below the ordinary high water line is a water of the United States. Waters of the United States were mapped for this report based on both the field investigation and photo interpretation. The project site contains about 7.9 acres of waters of the United States. A portion of Berryessa Creek from I-680 to about 600 feet upstream of Morrill Ave is contained within a concrete lined channel (see Map #3 and 4; BW-5). This portion of Berryessa Creek was not surveyed in the field, but contains about 1.86 acres of waters of the United States. Appendix 5 contains photos of selected reaches of Berryessa Creek.

The following table summarizes jurisdictional waters of the United States and wetland types and acreages found within the project site.

| Jurisdiction Type | Survey ID | Acres | Total Acres |
|--|------------------|--------------|--------------------|
| Waters of the United States | BW-3 | 2.207 | 8.031 |
| | BW-4 | 2.699 | |
| | BW-5 | 1.865 | |
| | BW-6 | 1.260 | |
| Other Waters of the United States ¹ | BW-1 | 0.403 | 0.792 |
| | BW-2 | 0.389 | |

¹ Areas identified as "other waters of the U.S" are also "waters of the U.S.," but are separated in this table as they also have wetland features such as hydrophytic vegetation and/or indicators of hydric soils in addition to a hydrologic connection to a navigable waterway.

References

Environmental Laboratory, Department of the Army. 1987 "Corps of Engineers Wetland Delineation Manual" (Technical Report Y-87-1). U.S. Army Corps of Engineers. Waterways Experimental Station. Vicksburg, Mississippi. 100 pp. + Appendices.

Hickman, James C., ed. 1993. The Jepson Manual, Higher Plants of California. University of California Press. Berkeley, California. 1400 pp.

Munsell. 1992. Soil Color Charts. Kollmorgen Instruments Corporation. Newburg, New York.

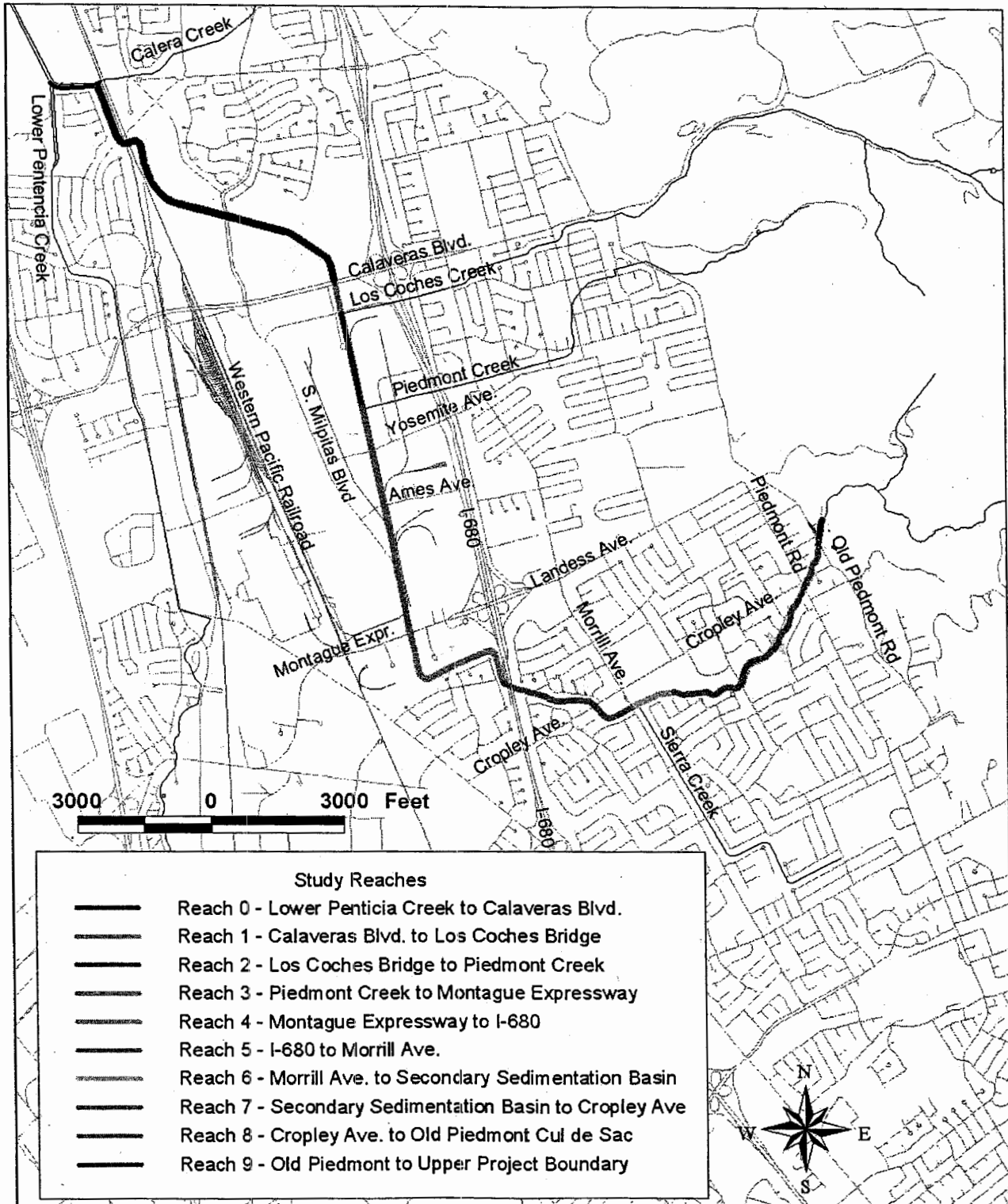
Reed, P.B., Jr. 1988. National list of plant species that occur in wetlands: California (Region 0). U.S. Fish and Wildlife Service Biol. Rep. 88(26.10) 135 pp.

United States Department of Agriculture, Soil Conservation Service, June 1958. Soil Survey for Santa Clara County, California.

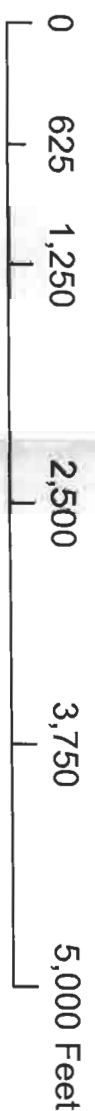
Appendix 1

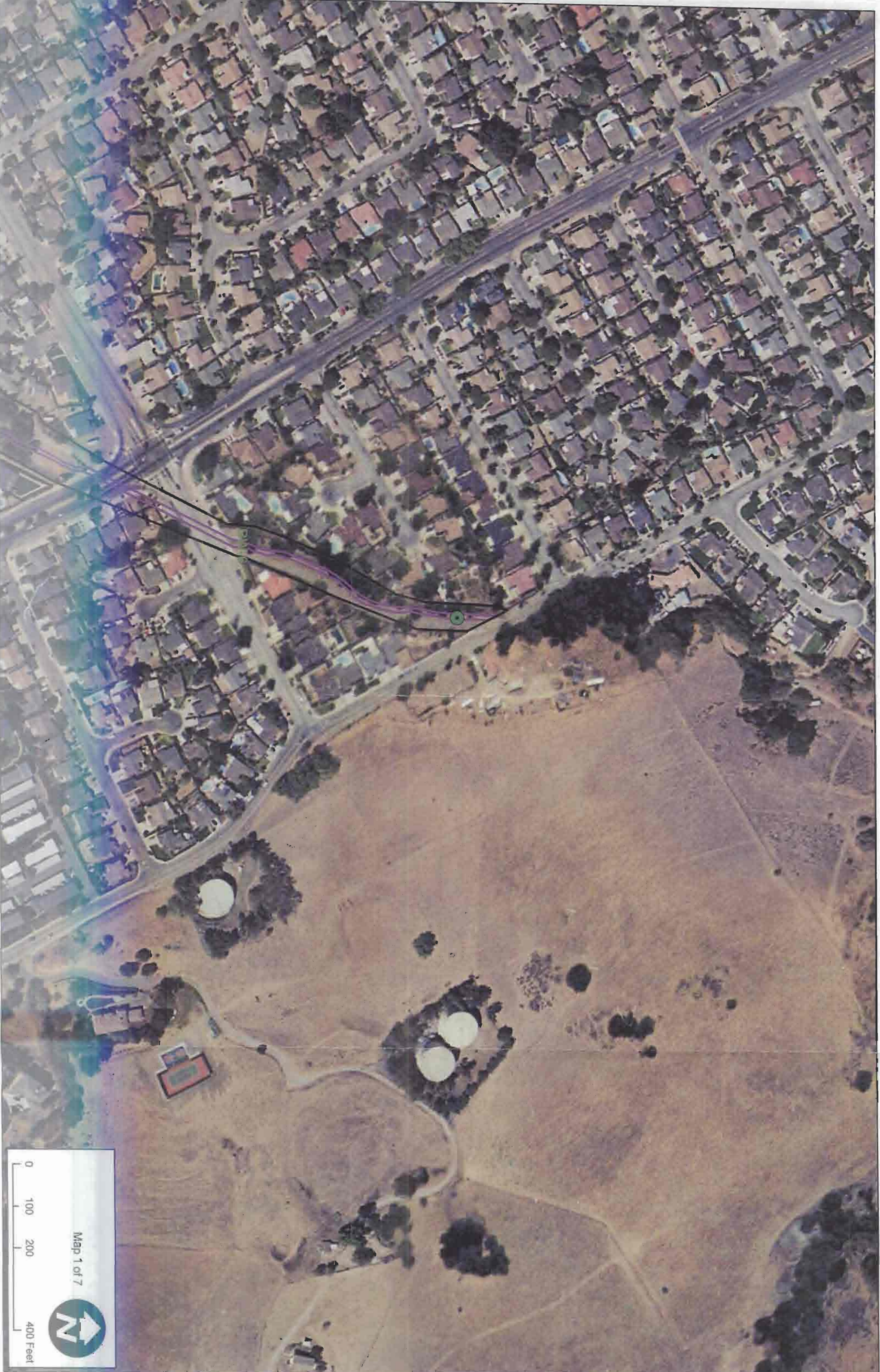
Project Area Maps






Beryessa Creek Flood Control Needs Reassessment

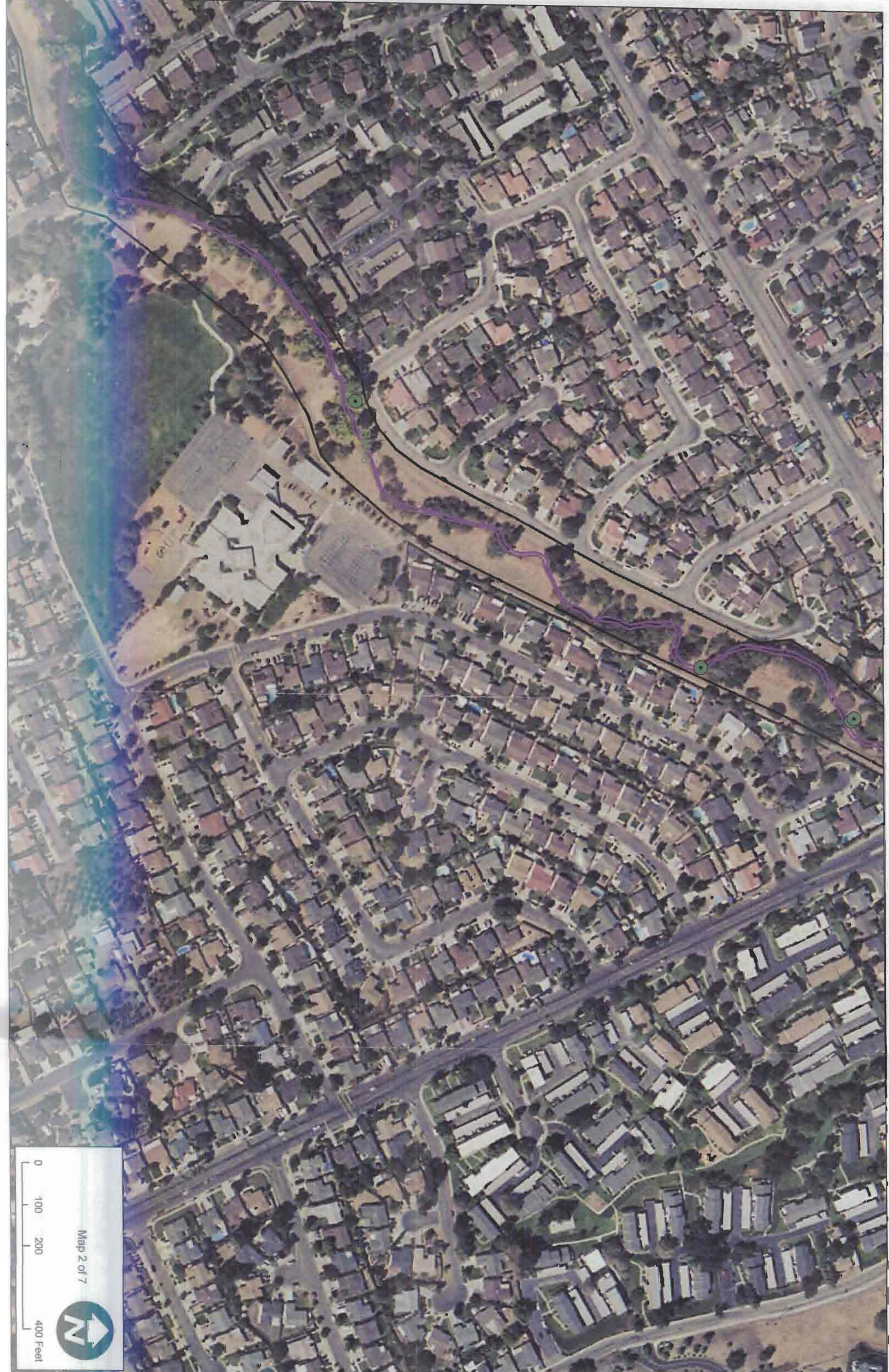




Map 1 of 7


0 100 200 400 Feet





Map 2 of 7

0 100 200 400 Feet

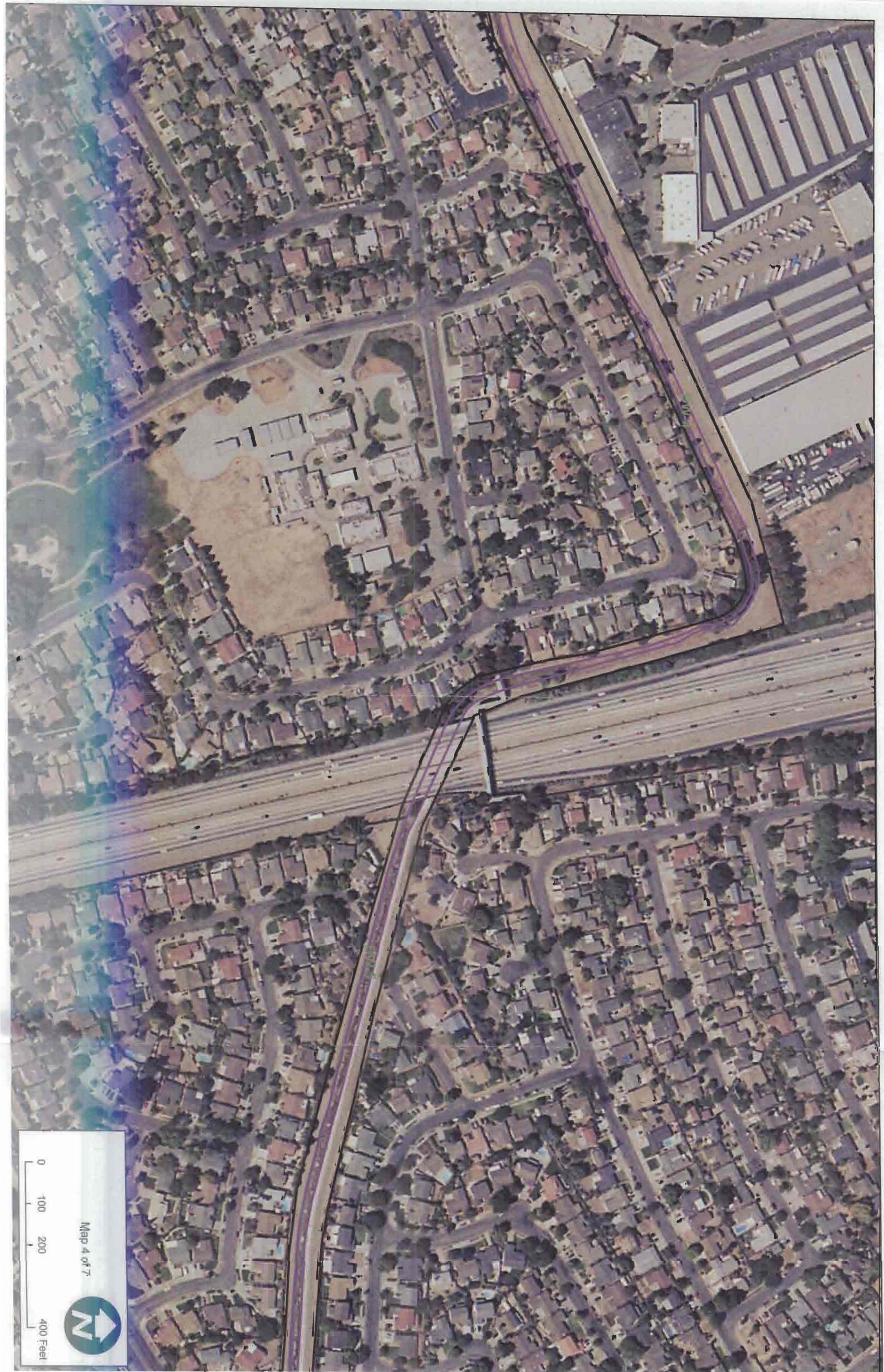




0 100 200 400 Feet

Map 3 of 7








Map 5 of 7

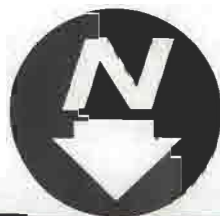
0 100 200 400 Feet

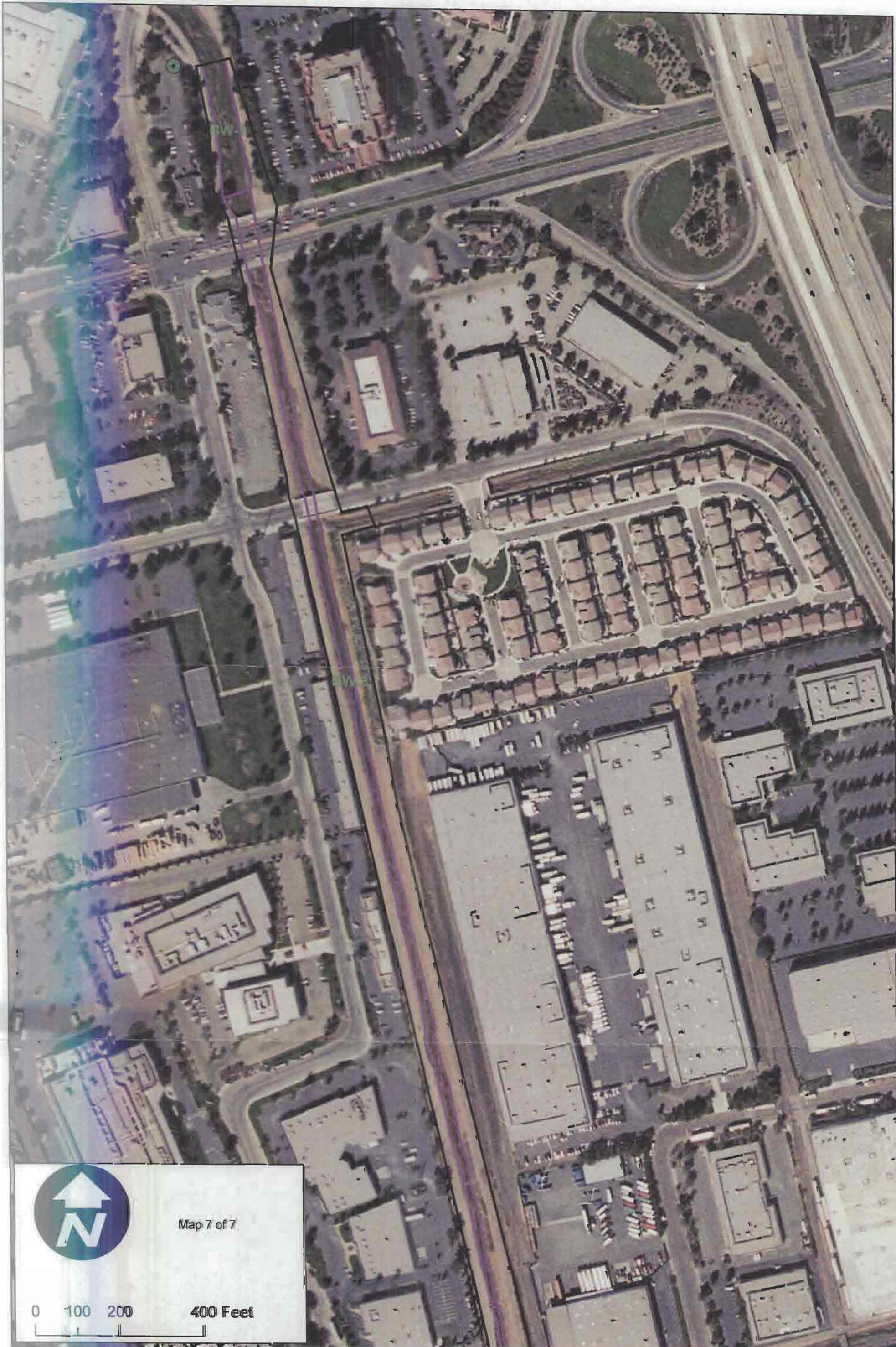
A horizontal scale bar with vertical tick marks at 0, 100, 200, and 400 feet.



0 100 200 400 Feet

Map 6 of 7





Map 7 of 7

0 100 200 400 Feet

Appendix 2

Names of Delineators and Preparers

Delineators

Mark Littlefield, U.S. Fish and Wildlife Service
Stephanie Rickabaugh, U.S. Fish and Wildlife Service

Preparers

Mark Littlefield, U.S. Fish and Wildlife Service

Appendix 3 Data Forms

from Bridge to Bridge.

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: _____ Application No.: 9 Project Name: _____

Location: _____ Plot #: _____ Date: _____ Determined By: _____

VEGETATION LAYER

| TREES | BASAL AREA | TOTAL BASAL AREA | RANK | HERBS * | MIDPOINT OF % COVER CLASS | RANK |
|-------|------------|------------------|------|------------------|---------------------------|--------------------|
| 1 | | | | 1 Simultaneous | ob | ob |
| 2 | | | | 2 waterlilies | 10% ob | ob |
| 3 | | | | 3 Cat-tail | 3% ob | ob |
| 4 | | | | 4 Poison hemlock | FACU | FACU |
| 5 | | | | 5 mustard, ob | 10% horse tail (little) | FACU |
| 6 | | | | 6 vetch | FACU | Rip-grass brown up |
| 7 | | | | 7 chickweed | FACU | |
| 8 | | | | 8 Yarrow | FACU | |
| 9 | | | | 9 wildoats | up | |
| 10 | | | | 10 dandelion | up | |

B3

| SAPLINGS/SHRUBS | MIDPOINT OF HEIGHT CLASS | TOTAL HEIGHT CLASS | RANK | WOODY VINES | NUMBER OF STEMS | RANK |
|-----------------|--------------------------|--------------------|------|-------------|-----------------|------|
|-----------------|--------------------------|--------------------|------|-------------|-----------------|------|

| | | | | | | |
|----|------|--|--|----|--|--|
| 1 | Palm | | | 1 | | |
| 2 | | | | 2 | | |
| 3 | | | | 3 | | |
| 4 | | | | 4 | | |
| 5 | | | | 5 | | |
| 6 | | | | 6 | | |
| 7 | | | | 7 | | |
| 8 | | | | 8 | | |
| 9 | | | | 9 | | |
| 10 | | | | 10 | | |

8/16

* 100% grass

DATA FORM 3
ATYPICAL SITUATIONS

Applicant
Name: _____
Location: San Joaquin CA

Application
Number: _____
Plot Number: 9

Project
Name: Berryessa Creek
Date: 1/26/05

A. VEGETATION:

1. Type of Alteration: area sprayed to remove
woody vegetation

2. Effect on Vegetation: _____

3. Previous Vegetation: unknown
(Attach documentation) _____

4. Hydrophytic Vegetation? Yes ☒ No _____

B. SOILS:

1. Type of Alteration: Channel is constructed within
a largely upland soil type -

2. Effect on Soils: wetland soils are new and
lack development due to created
channel and likely dredging (maintenance)

3. Previous Soils: upland
(Attach documentation) _____

4. Hydric Soils? Yes ☒ No _____

C. HYDROLOGY:

1. Type of Alteration: Constructed trapezoidal Channel

2. Effect on Hydrology: _____

3. Previous Hydrology: _____
(Attach documentation) _____

4. Wetland Hydrology? Yes ☒ No _____

Characterized By: W. J. F. F.

DATA FORM 1
WETLAND DETERMINATION

Applicant Name: _____ Application Number: _____ Project Name: Bennyarra Creek
State: CA County: San Clara Legal Description: _____ Township: _____ Range: _____
Date: 1/26/05 Plot No.: ~~713~~ BW-2 Section: BW-2

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

| <u>Species</u> | <u>Indicator Status</u> | <u>Species</u> | <u>Indicator Status</u> |
|----------------------------|-------------------------|--------------------|-------------------------|
| <u>Trees</u> | | <u>Herbs</u> | |
| 1. — | | 7. wild a/c | uPL |
| 2. | | 8. mustard | uPL |
| 3. | | 9. cattail | OBL |
| <u>Saplings/shrubs</u> | | <u>Woody vines</u> | |
| 4. willow (sprayed & dead) | | 10. — | |
| 5. | | 11. | |
| 6. | | 12. | |

See dash sheet for full list and percentages of each species.

% of species that are OBL, FACW, and/or FAC: 60%. Other indicators: _____.

Hydrophytic vegetation: Yes X No _____. Basis: % of plant species present which have Hydrophytic.

Soil

Series and phase: Orestimba Silty Clay loam On hydric soils list? Yes ____; No X.

Mottled: Yes ____; No X. Mottle color: _____; Matrix color: 2.5Y02 (moist)

Gleyed: Yes ____ No X Other indicators: _____.

Hydric soils: Yes X No ____; Basis: chroma of less than 1.
Soil type can have inclusions/not normal conditions -

Hydrology

Inundated: Yes X; No _____. Depth of standing water: 9" average.

Saturated soils: Yes X; No _____. Depth to saturated soil: 0.

Other indicators: high water line / mound.

Wetland hydrology: Yes X; No _____. Basis: _____.

Atypical situation: Yes X; No _____.

Normal Circumstances? Yes X No _____.

Wetland Determination: Wetland site is wetland; Nonwetland _____.

Comments: site is a wetland occurring at or below ordinary high water line of this channel -

Determined by: Mark A. Smith

B2

Boundary of this site is between points 7 and 8 within the defined channel.

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: _____ Application No.: _____ Project Name: _____
 Location: _____ Plot #: 7 Date: _____ Determined By: _____

VEGETATION LAYER

| TREES | BASAL AREA | TOTAL BASAL AREA | RANK | HERBS | MIDPOINT OF % COVER CLASS | RANK |
|-------|------------|------------------------|------|------------------|------------------------------|------|
| 1 | | | | 1 Cat tail | 5% | OBL |
| 2 | | | | 2 Wild Oats | | upL |
| 3 | | | | 3 mustard | | upL |
| 4 | | | | 4 Rumex crispus | < 1% | FACW |
| 5 | | | | 5 purple Vetch | | FALU |
| 6 | | | | 6 Red Shamrock | | FACW |
| 7 | | | | 7 Basin Wild Rye | | upL |
| 8 | | | | 8 Watercress | < 1% | OBL |
| 9 | | | | 9 Horse-tail | 2% | OBL |
| 10 | | | | | | |

| SAPLINGS/SHRUBS | MIDPOINT OF HEIGHT CLASS | TOTAL HEIGHT CLASS | RANK | WOODY VINES | NUMBER OF STEMS | RANK |
|----------------------------------|-----------------------------|--------------------------|------|-------------|--------------------|------|
| 1 Palm tree | 1 (small < 12" tree) | | ? | 1 | | |
| 2 Willow - (dead from spraying?) | | | OBL | 2 | | 6/10 |
| 3 | | | | 3 | | |
| 4 | | | | 4 | | |
| 5 | | | | 5 | | |
| 6 | | | | 6 | | |
| 7 | | | | 7 | | |
| 8 | | | | 8 | | |
| 9 | | | | 9 | | |
| 10 | | | | 10 | | |

DATA FORM 3
ATYPICAL SITUATIONS

Applicant Name: _____ Application Number: _____ Project Name: Berrigawa Creek
Location: Santa Clara, CA Plot Number: 7/8 Date: 1/26/05

A. VEGETATION:

1. Type of Alteration: area sprayed to control woody shrubs, site may also be mowed
2. Effect on Vegetation: minimal vegetation / removal
3. Previous Vegetation: unknown
(Attach documentation) _____
4. Hydrophytic Vegetation? Yes X No _____

B. SOILS:

1. Type of Alteration: channel is constructed on upland soil types
channel is ripraped cutting to parent
2. Effect on Soils: materials
3. Previous Soils: _____
(Attach documentation) _____
4. Hydric Soils? Yes _____ No X

C. HYDROLOGY:

1. Type of Alteration: Channel is constructed to constructed feature - no flood plain or adjacent wetlands
2. Effect on Hydrology: _____
3. Previous Hydrology: _____
(Attach documentation) _____
4. Wetland Hydrology? Yes X No _____

Characterized By: Mark A. Linford

DATA FORM 1
WETLAND DETERMINATION

Applicant Name: _____ Application Number: _____ Project Name: Bennyessa Creek
State: CA County: Santa Clara Legal Description: _____ Township: _____ Range: _____
Date: 1/25/05 Plot No.: 7 BW-6 Section: _____

Transect 1

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

| Species | Indicator Status | Species | Indicator Status |
|-----------------------------------|------------------|--------------------|------------------|
| <u>Trees</u> | | <u>Herbs</u> | |
| 1. Pacific Willow | OBL | 7. see Data Form | |
| 2. <u>(Salix lasioandra)</u> | | 8. | |
| 3. Coastal Live oak | upL | 9. | |
| 3. Elderberry (<u>Sambucus</u>) | FAC | | |
| <u>Saplings/shrubs</u> | | <u>Woody vines</u> | |
| 4. | | 10. | |
| 5. see Data Form | | 11. see Data Form | |
| 6. | | 12. | |

% of species that are OBL, FACW, and/or FAC: 37% Other indicators: _____
Hydrophytic vegetation: Yes _____ No _____. Basis: _____

Soil

Series and phase: Mocho gravelly loam On hydric soils list? Yes _____; No X.
Mottled: Yes _____; No X. Mottle color: _____; Matrix color: _____.
Gleyed: Yes _____ No X Other indicators: _____.
Hydric soils: Yes _____ No X; Basis: not on hydric soils list, no indicators.
Channel bottom gravelly/cobble

Hydrology

Inundated: Yes X; No _____. Depth of standing water: 6".
Saturated soils: Yes X; No _____. Depth to saturated soil: 0.
Other indicators: _____.
Wetland hydrology: Yes X; No _____. Basis: water present and flowing on site.
Atypical situation: Yes _____; No X.
Normal Circumstances? Yes X No _____.
Wetland Determination: Wetland _____; Nonwetland non wetland

Comments: site is partially vegetated stream channel with seasonal flows. Site is water of the U.S.

Determined by: Mark J. Luff

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: _____

Application No.: _____

Project Name: Banyan Creek

Location: _____

Plot #: 1

Date: 1/25/05

Determined By: _____

VEGETATION LAYER

| TREES | BASAL AREA | TOTAL BASAL AREA | RANK | HERBS | MIDPOINT OF % COVER CLASS | RANK |
|------------------|------------|------------------|------|----------------|---------------------------|------|
| 1 Willow Pacific | 12" | | ✓ | 1 Dock-curl | | ✓ |
| 2 Oak Calcedal | " | | WPL | 2 Carex | | ✓ |
| 3 Elderberry | 6" | | ✓ | 3 Wild oats | | ✓ |
| | | | | 4 Ripgut brome | | ✓ |
| | | | | 5 *Licorice | | ✓ |
| | | | | 6 Vetch | | ✓ |
| | | | | 7 Cal Poppy | | ✓ |
| | | | | 8 Mustard | | ✓ |
| | | | | 9 Fern (unid) | | ✓ |
| | | | | 10 | | |

B3

| SAPLINGS/SHRUBS | MIDPOINT OF HEIGHT CLASS | TOTAL HEIGHT CLASS | RANK | WOODY VINES | NUMBER OF STEMS | RANK |
|--------------------|--------------------------|--------------------|------|-------------|-----------------|------|
| 1 Bird's foot sage | | | ✓ | 1 | | ✓ |
| 2 Pyracantha | | | ✓ | 2 | | ✓ |
| 3 Baccharis | | | ✓ | 3 | | ✓ |
| 4 Eucalyptus | | | ✓ | 4 | | ✓ |
| 5 | | | | 5 | | ✓ |
| 6 | | | | 6 | | ✓ |
| 7 | | | | 7 | | ✓ |
| 8 | | | | 8 | | ✓ |
| 9 | | | | 9 | | ✓ |
| 10 | | | | 10 | | ✓ |

Comment: inside channel w/ water pool and Riffle
low-lying Substrait
woodland soils
Bank full width 12'

DATA FORM 1
WETLAND DETERMINATION

Applicant Name: _____ Application Number: _____ Project Name: Berryessa Creek
State: CA County: San Clara Legal Description: _____ Township: _____ Range: _____
Date: 1/25/05 Plot No.: 2 BW6 Section: _____

Transect 2

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

| Species | Indicator Status | Species | Indicator Status |
|------------------------|------------------|--------------------|------------------|
| <u>Trees</u> | | <u>Herbs</u> | |
| 1. Sycamore | Fac w | 7. wild oats | upL |
| 2. California Buckeye | upL | 8. Rip-bud brounne | upL |
| 3. California Live Oak | upL | 9. oxalis | Fac |
| <u>Saplings/shrubs</u> | | <u>Woody vines</u> | |
| 4. B | | 10. | |
| 5. | | 11. | |
| 6. | | 12. | |

% of species that are OBL, FACW, and/or FAC: 38% Other indicators: _____.

Hydrophytic vegetation: Yes _____ No X. Basis: % of wetland vegetation.

Soil

Series and phase: Mocho gravelly loam On hydric soils list? Yes _____; No X.
Mottled: Yes _____; No X. Mottle color: _____; Matrix color: _____.
Gleyed: Yes _____ No X Other indicators: _____.
Hydric soils: Yes _____ No X; Basis: _____.

Hydrology

Inundated: Yes X; No _____. Depth of standing water: _____.
Saturated soils: Yes X; No _____. Depth to saturated soil: 0.
Other indicators: _____.
Wetland hydrology: Yes X; No _____. Basis: Water flowing and present on site.
Atypical situation: Yes _____; No X.
Normal Circumstances? Yes X No _____.
Wetland Determination: Wetland _____; Nonwetland non-wetland

Comments: Site is a partially vegetated stream channel w/ seasonal flows
Site is water of the U.S.

Determined by: Mark A. [signature]
B2

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: _____

Application No.: _____

Project Name: Beverly Creek

Location: _____ Plot #: 2

Date: 1/25/05

Determined By: _____

VEGETATION LAYER

| TREES | BASAL AREA | TOTAL BASAL AREA | RANK | HERBS | MIDPOINT OF % COVER CLASS | RANK |
|---------------|--------------|------------------|-------|--------------|---------------------------|-------|
| 1 Pepper | | | upl | 1 Vetch | | Fac u |
| 2 Elder | Sambucus | Cervulosa | Fac ✓ | 2 W. Cat | | upl |
| 3 Co Live Oak | | | upl | 3 Geranium | | Fac u |
| 4 Cal Buckeye | | | Fac ✓ | 4 Curry Dock | | Fac u |
| 5 Bay Laurel | Yubellavaria | Californica | | 5 Mustard | | upl |
| 6 Sycamore | Platanus | Racemosa | Fac u | 6 Oxalis | | Fac ✓ |
| 7 | | | | 7 | | |
| 8 | | | | 8 | | |
| 9 | | | | 9 | | |
| 10 | | | | 10 | | |

B3

5/13

| SAPLINGS/SHRUBS | MIDPOINT OF HEIGHT CLASS | TOTAL HEIGHT CLASS | RANK | WOODY VINES | NUMBER OF STEMS | RANK |
|-----------------|--------------------------|--------------------|------|-------------|-----------------|------|
|-----------------|--------------------------|--------------------|------|-------------|-----------------|------|

| | | | | | | |
|------------------|-----|--|----|--|--|--|
| 1 Birdfoot Sage | upl | | 1 | | | |
| 2 Cactus-Opuntia | upl | | 2 | | | |
| 3 | | | 3 | | | |
| 4 | | | 4 | | | |
| 5 | | | 5 | | | |
| 6 | | | 6 | | | |
| 7 | | | 7 | | | |
| 8 | | | 8 | | | |
| 9 | | | 9 | | | |
| 10 | | | 10 | | | |

Comment

16 ft. - Bankfull chan w
Gravel channel w/ H₂O
mo wetland soil

DATA FORM 1
WETLAND DETERMINATION

Applicant Name: _____ Application Number: _____ Project Name: Berryessa Creek
State: CA County: Santa Clara Legal Description: _____ Township: _____ Range: _____
Date: 1/25/05 Plot No.: FW-6 Section: _____

Transect 3

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

| Species | Indicator Status | Species | Indicator Status |
|-------------------------------|------------------|-----------------------|------------------|
| <u>Trees</u> | | <u>Herbs</u> | |
| 1. <u>Sycamore</u> | | 7. <u>Rip bud</u> | |
| 2. <u>California Live Oak</u> | | 8. <u>Horseweed</u> | |
| 3. <u>Buckeye</u> | | 9. <u>Fennel</u> | |
| <u>Saplings/shrubs</u> | | <u>Woody vines</u> | |
| 4. _____ | | 10. <u>Blackberry</u> | |
| 5. _____ | | 11. _____ | |
| 6. _____ | | 12. _____ | |

See Attached
Data Form #2

% of species that are OBL, FACW, and/or FAC: 30%. Other indicators: _____.

Hydrophytic vegetation: Yes _____ No X. Basis: % of wetland species.

Soil

Series and phase: Mocha Loam On hydric soils list? Yes _____; No X.

Mottled: Yes _____; No X. Mottle color: _____; Matrix color: _____.

Gleyed: Yes _____ No X Other indicators: _____.

Hydric soils: Yes _____ No X; Basis: _____.

Hydrology

Inundated: Yes X; No _____. Depth of standing water: 9'-12".

Saturated soils: Yes X; No _____. Depth to saturated soil: 0.

Other indicators: _____.

Wetland hydrology: Yes X; No _____. Basis: Water flowing and present on site.

Atypical situation: Yes _____; No X.

Normal Circumstances? Yes X No _____.

Wetland Determination: Wetland _____; Nonwetland non-wetland

Comments: Site is a partially vegetated stream channel w/ some wetland vegetation flows are seasonal. Site is a Water of the U.S. but not a wetland

Determined by: Mark A. Springfield

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: _____

Application No.: _____

Project Name: _____

Location: _____

Plot #: 5

Date: 1/25/07

Determined By: _____

VEGETATION LAYER

| TREES | BASAL AREA | TOTAL BASAL AREA | RANK | HERBS | MIDPOINT OF % COVER CLASS | RANK |
|----------------|------------|------------------|------|---------------|---------------------------|--------|
| 1 Sycamore | | | FAcW | ✓ 1 Hornhound | | FAcW ✓ |
| 2 Cal Co Lidak | | | u8L | 2 Fernel | | FAcW |
| 3 Buckeye | | | uPL | 3 Mustard | | uPL |
| 4 Bay Laurel | | | FAc | ✓ 4 W. Oats | | uPL |
| 5 | | | | 5 Dandelion | | FAcW |
| 6 | | | | 6 Rip Gut | | uPL |
| 7 | | | | 7 Greenium | | FAcW |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |

B3

| SAPPLINGS/SHRUBS | MIDPOINT OF HEIGHT CLASS | TOTAL HEIGHT CLASS | RANK | WOODY VINES | NUMBER OF STEMS | RANK |
|------------------|--------------------------|--------------------|------|--------------|-----------------|------|
| 1 Pyracantha | | | ✓ | 1 Blackberry | | FAcW |
| 2 Birds - sage | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |

4/13

30%

Bank full 6 ft
Cobb/gravel Bottom
Riparian Pool

DATA FORM 1
WETLAND DETERMINATION

Applicant Name: _____ Application Number: _____ Project Name: Bonanza Creek
State: CA County: Sub. Clev Legal Description: _____ Township: _____ Range: _____
Date: 1/25/05 Plot No.: BLW-6 Section: _____

Transect 4

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

| <u>Species</u> | <u>Indicator Status</u> | <u>Species</u> | <u>Indicator Status</u> | |
|------------------------------|-------------------------|-------------------------|-------------------------|------------------------|
| <u>Trees</u> | | <u>Herbs</u> | | <u>See Data Form 2</u> |
| 1. Cottonwood | | 7. Ribwort | | |
| 2. California Coast Live Oak | | 8. Carex | | |
| 3. Buckeye | | 9. Elder (basin willow) | | |
| <u>Saplings/shrubs</u> | | <u>Woody vines</u> | | |
| 4. — | | 10. — | | |
| 5. — | | 11. — | | |
| 6. — | | 12. — | | |

% of species that are OBL, FACW, and/or FAC: 33% Other indicators: _____
Hydrophytic vegetation: Yes _____ No X Basis: _____

Soil

Series and phase: Machos Clay loam On hydric soils list? Yes _____; No X.
Mottled: Yes _____; No X. Mottle color: _____; Matrix color: _____
Gleyed: Yes _____ No X Other indicators: _____
Hydric soils: Yes _____ No X; Basis: no indicators

Hydrology

Inundated: Yes X; No _____. Depth of standing water: 3"-6".
Saturated soils: Yes X; No _____. Depth to saturated soil: 0.
Other indicators: _____
Wetland hydrology: Yes X; No _____. Basis: standing/flooding water on site
Atypical situation: Yes X; No _____. see additional data sheet
Normal Circumstances? Yes _____ No _____

Wetland Determination: Wetland _____; Nonwetland non-wetland

Comments: site located on a channelized section of stream (old) based on old topo maps and 1958 soils in formation
However the site is a water of the U.S.

Determined by: Mark A. [signature]

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: _____

Application No.: _____

Project Name: _____

Location: _____

Plot #: 4

Date: 1/25/05

Determined By: _____

VEGETATION LAYER

TREES

- 1 Cottonwood (~~Populus~~ Salix sp.)
- 2 Red Grand Oak
- 3 Buckeye

BASAL AREA

> 16"

TOTAL BASAL AREA

RANK

- 1 gerranium
- 2 canix
- 3 rip gut
- 4 oxalis
- 5 alamus (basin w. 10 yds)
- 6 aster
- 7 curly dock
- 8
- 9
- 10

MIDPOINT OF % COVER CLASS

RANK

- 1 FAC u
- 2 FAC u
- 3 upl
- 4 FAC u
- 5 VI
- 6 ? probably upl
- 7 FAC u
- 8
- 9
- 10

B3

SAPLINGS/SHRUBS

MIDPOINT OF HEIGHT CLASS

TOTAL HEIGHT CLASS

RANK

WOODY VINES

NUMBER OF STEMS

RANK

3/4

based on location of plant

Comments

chan. with 6-12 ft. grav/cob silt deposition (small)

DATA FORM 3
ATYPICAL SITUATIONS

Applicant Name: _____ Application Number: _____ Project Name: Berryessa Creek
Location: _____ Plot Number: 4 Date: 1/25/05

A. VEGETATION:

1. Type of Alteration: Area is regularly disced adjacent to stream channel, well above the ordinary high water mark.
2. Effect on Vegetation: Vegetation is mainly Ruderal annual grasses
3. Previous Vegetation: _____
(Attach documentation) _____
4. Hydrophytic Vegetation? Yes _____ No X

B. SOILS:

1. Type of Alteration: _____
2. Effect on Soils: _____
3. Previous Soils: _____
(Attach documentation) _____
4. Hydric Soils? Yes _____ No X

C. HYDROLOGY:

1. Type of Alteration: Natural Channel has been re-located to its present channel location
2. Effect on Hydrology: Site was previously w/in the historic floodplain however floodplain was not historically a wetland
3. Previous Hydrology: upland
(Attach documentation) _____
4. Wetland Hydrology? Yes X No _____

new stream channel

Characterized By: Mark D. [signature]

DATA FORM 1
WETLAND DETERMINATION

Applicant Name: _____ Application Number: _____ Project Name: Berryessa Creek
State: CA County: San Clara Legal Description: _____ Township: _____ Range: _____
Date: 1/25/05 Plot No.: BW-6 Section: _____

Transect 5

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

| Species | Indicator Status | Species | Indicator Status |
|----------------------------------|------------------|--------------------|------------------|
| <u>Trees</u> | | <u>Herbs</u> | |
| 1. Cottonwood | FACW | 7. R. pugil | upL |
| 2. Buckeye | upL | 8. willows | upL |
| 3. California Live Oak (coastal) | upL | 9. Oxalis | FACW |
| <u>Saplings/shrubs</u> | | <u>Woody vines</u> | |
| 4. — | | 10. — | |
| 5. — | | 11. — | |
| 6. — | | 12. — | |

% of species that are OBL, FACW, and/or FAC: 12% Other indicators: _____
Hydrophytic vegetation: Yes _____ No X Basis: _____

Soil

Series and phase: Mocha Clay loam On hydric soils list? Yes _____; No X.
Mottled: Yes _____; No X. Mottle color: _____; Matrix color: _____
Gleyed: Yes _____ No X Other indicators: _____
Hydric soils: Yes _____ No X; Basis: _____

Hydrology

Inundated: Yes _____; No X. Depth of standing water: _____
Saturated soils: Yes X; No X. Depth to saturated soil: 0
Other indicators: Soils damp within channel
Wetland hydrology: Yes X; No _____. Basis: _____
Atypical situation: Yes X; No _____.
Normal Circumstances? Yes _____ No X.

Wetland Determination: Wetland _____; Nonwetland non-wetland.

Comments: Site is on a channelized section of Berryessa Creek
Stream is a water of the U.S.

Stream is flashy evidence of recent flows include grassed bank over by flows, wrack line.

Determined by: Mark A. [signature]

B2

Soil sample #1

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: _____ Application No.: _____ Project Name: _____

Location: _____ Plot #: 5 Date: 1/25/05 Determined By: _____

VEGETATION LAYER

| TREES | BASAL AREA | TOTAL BASAL AREA | RANK | HERBS | MIDPOINT OF % COVER CLASS | RANK |
|-------|------------|------------------|------|-------|---------------------------|------|
|-------|------------|------------------|------|-------|---------------------------|------|

| | | | | | | |
|--------------|--|--|--|--------------|--|-------|
| 1 Buckeye | | | | 1 Oxalis | | Fac u |
| 2 Cottonwood | | | | 2 CARIX | | Fac u |
| 3 Cat's Oak | | | | 3 fennel | | Fac u |
| 4 Privet | | | | 4 Rip root | | u p l |
| 5 | | | | 5 wild cress | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |

B3

| SAPLINGS/SHRUBS | MIDPOINT OF HEIGHT CLASS | TOTAL HEIGHT CLASS | RANK | WOODY VINES | NUMBER OF STEMS | RANK |
|-----------------|--------------------------|--------------------|------|-------------|-----------------|------|
|-----------------|--------------------------|--------------------|------|-------------|-----------------|------|

| | | | | | | |
|----------|--|--|----|--|--|--|
| 1 privet | | | 1 | | | |
| 2 | | | 2 | | | |
| 3 | | | 3 | | | |
| 4 | | | 4 | | | |
| 5 | | | 5 | | | |
| 6 | | | 6 | | | |
| 7 | | | 7 | | | |
| 8 | | | 8 | | | |
| 9 | | | 9 | | | |
| 10 | | | 10 | | | |

gravel/sand bottom
dry
6-8 ft wide
depth 9-12" with trees

DATA FORM 3
ATYPICAL SITUATIONS

Applicant Name: _____ Application Number: _____ Project Name: Berrigessa Creek
Location: Santa Clara Plot Number: #5 Date: 1/23/05

A. VEGETATION:

1. Type of Alteration: Area is regularly bisected adjacent to stream channel.
2. Effect on Vegetation: Vegetation is mainly Raderal annual grasses
3. Previous Vegetation: _____
(Attach documentation) _____
4. Hydrophytic Vegetation? Yes _____ No X

B. SOILS:

1. Type of Alteration: _____
2. Effect on Soils: _____
3. Previous Soils: _____
(Attach documentation) _____
4. Hydric Soils? Yes _____ No X

C. HYDROLOGY:

1. Type of Alteration: natural channel has been filled and channel re-located to new location (present) soils are not hydric
2. Effect on Hydrology: _____
3. Previous Hydrology: _____
(Attach documentation) _____
4. Wetland Hydrology? Yes X No _____

Characterized By: [Signature]

DATA FORM 1
WETLAND DETERMINATION

Applicant Name: _____ Application Number: _____ Project Name: Bonanza Creek
State: CA County: San Clara Legal Description: _____ Township: _____ Range: _____
Date: 1/25/05 Plot No.: B BW 6 Section: _____
Transect 6

Vegetation [list the three dominant species in each vegetation layer (5 if only 1 or 2 layers)]. Indicate species with observed morphological or known physiological adaptations with an asterisk.

| <u>Species</u> | <u>Indicator Status</u> | <u>Species</u> | <u>Indicator Status</u> |
|---------------------------------------|-------------------------|---------------------------------|---|
| <u>Trees</u> | | <u>Herbs</u> | |
| 1. <u>allanberry</u> | <u>FAC</u> | 7. <u>willows</u> | <u>upl</u> |
| 2. <u>California Coastal Live Oak</u> | <u>upl</u> | 8. <u>magwort</u> | <u>FACW</u> (<u>Antennaria douglasiana</u>) |
| 3. _____ | | 9. <u>american purple yelch</u> | <u>FACW</u> |
| <u>Saplings/shrubs</u> | | <u>Woody vines</u> | |
| 4. _____ | | 10. <u>Blackberry (H)</u> | <u>FACW</u> |
| 5. _____ | | 11. _____ | |
| 6. _____ | | 12. _____ | |

% of species that are OBL, FACW, and/or FAC: 37% Other indicators: _____
Hydrophytic vegetation: Yes _____ No X Basis: _____

Soil

Series and phase: Clearlake Clay On hydric soils list? Yes _____; No X.
Mottled: Yes _____; No X. Mottle color: _____; Matrix color: _____.
Gleyed: Yes _____ No X Other indicators: _____.
Hydric soils: Yes _____ No X; Basis: _____.

Hydrology

Inundated: Yes _____; No X. Depth of standing water: 0.
Saturated soils: Yes X; No _____. Depth to saturated soil: Surface.
Other indicators: high water mark / debris and grasses bent over
Wetland hydrology: Yes X; No _____. Basis: _____.
Atypical situation: Yes X; No _____.
Normal Circumstances? Yes _____ No X.
Wetland Determination: Wetland _____; Nonwetland nonwetland.
Comments: water of the US.

Determined by: [Signature]
B2

DATA FORM 2

VEGETATION-COMPREHENSIVE DETERMINATION

Applicant Name: _____ Application No.: _____ Project Name: _____

Location: _____ Plot #: 16 Date: 1/25/65 Determined By: _____

VEGETATION LAYER

| TREES | BASAL AREA | TOTAL BASAL AREA | RANK | HERBS | MIDPOINT OF % COVER CLASS | RANK |
|---------------|------------|------------------|------|-----------------------|---------------------------|--------|
| 1 Cal Co. Oak | | | upl | 1 Mustard | | upl |
| 2 Elderberry | | | FAc | 2 Vetch (ann. purple) | | FAc in |
| 3 | | | | 3 Cal. Poppy | | upl |
| 4 | | | | 4 W. oaks | | upl |
| 5 | | | | 5 mugwort | | FAc in |
| 6 | | | | 6 | | |
| 7 | | | | 7 | | |
| 8 | | | | 8 | | |
| 9 | | | | 9 | | |
| 10 | | | | 10 | | |

B3

| SAPLINGS/SHRUBS | MIDPOINT OF HEIGHT CLASS | TOTAL HEIGHT CLASS | RANK | WOODY VINES | NUMBER OF STEMS | RANK |
|-----------------|--------------------------|--------------------|------|--------------|-----------------|------|
| 1 | | | | 1 Blackberry | FAc in | |
| 2 | | | | 2 | | |
| 3 | | | | 3 | | |
| 4 | | | | 4 | | |
| 5 | | | | 5 | | |
| 6 | | | | 6 | | |
| 7 | | | | 7 | | |
| 8 | | | | 8 | | |
| 9 | | | | 9 | | |
| 10 | | | | 10 | | |

3/8 .37

DATA FORM 3
ATYPICAL SITUATIONS

Applicant Name: _____ Application Number: _____ Project Name: Berryessa Creek
Location: Sack Channel Plot Number: 6 Date: 1/25/05

A. VEGETATION:

1. Type of Alteration: Area is regularly disced adjacent to stream channel
2. Effect on Vegetation: Vegetation is vascular Annual grasses and invasive non-natives
3. Previous Vegetation: _____
(Attach documentation) _____
4. Hydrophytic Vegetation? Yes _____ No X

B. SOILS:

1. Type of Alteration: _____
2. Effect on Soils: _____
3. Previous Soils: _____
(Attach documentation) _____
4. Hydric Soils? Yes _____ No _____

C. HYDROLOGY:

1. Type of Alteration: natural channel has been filled and channel re-located to present location on upland soils
2. Effect on Hydrology: channel is insized / water continues to flow during storm events and continues
3. Previous Hydrology: _____
(Attach documentation) _____
4. Wetland Hydrology? Yes X No _____

Characterized By: Mark J. Smith

Appendix 4

Plant Species List

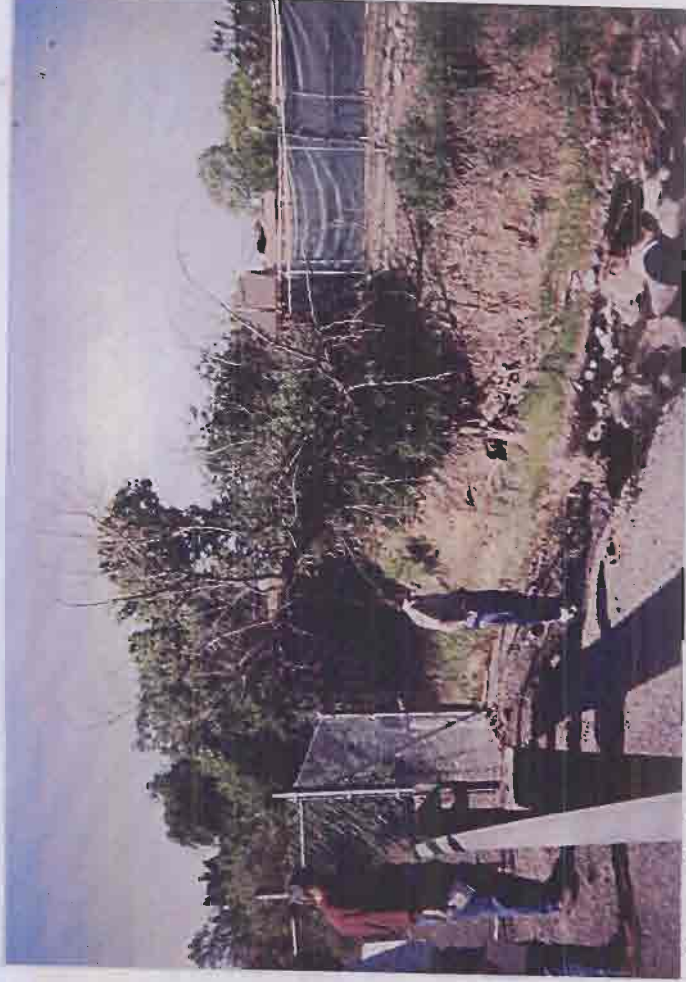
Artemisia californica
Artemisia douglasiana
Avena fatua
Aesculus californica
Baccharis pilularis
Bromis mollis
Bromis rubens
Carex spp.
Equisetum telmateia
Foeniculum vulgare
Galium aparine
Geranium dissectum
Geranium richardsonii
Hordeum jubatum
Hordium hystrix
Hippuris vulgaris
Juncus xiphiodes
Lolium perenne
Marrubium vulgare
Oxalis corniculata
Platanus racemosa
Populus fremontii
Quercus agrifolia
Rumex crispus
Rorippa nasturtium-aquaticum
Salix lasiandra
Sanbucus cerulem
Sisymbrium altissimum
Typha latifolia
Umbellularia californica
Vicia americana

Appendix 5

Selected Site Photos



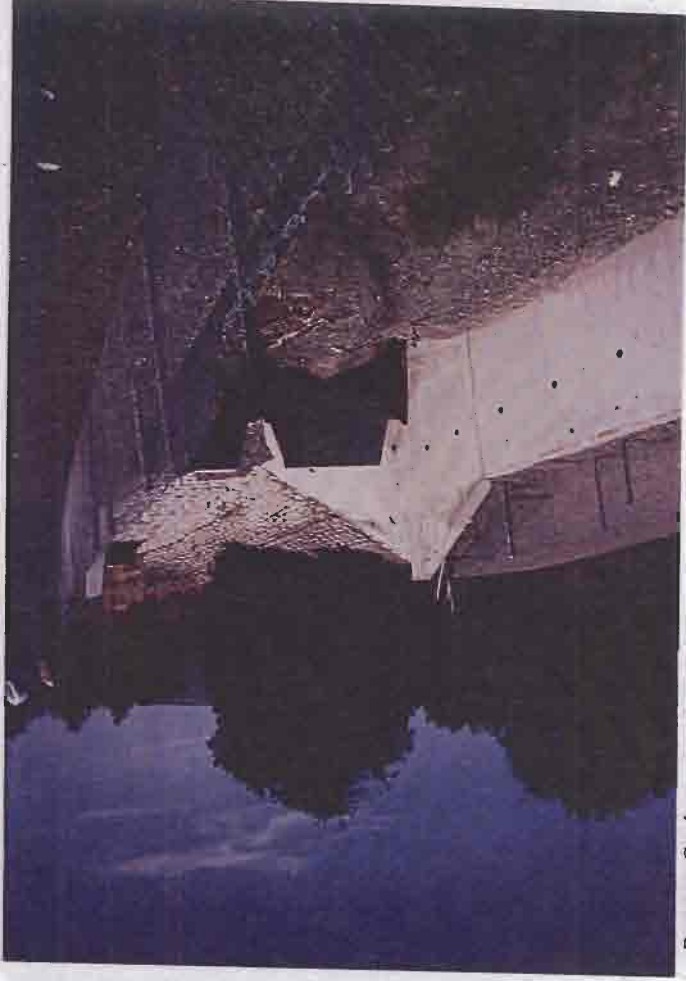
Structure at
Old Piedmont Rd.



Berryessa Creek
Old Piedmont Rd.



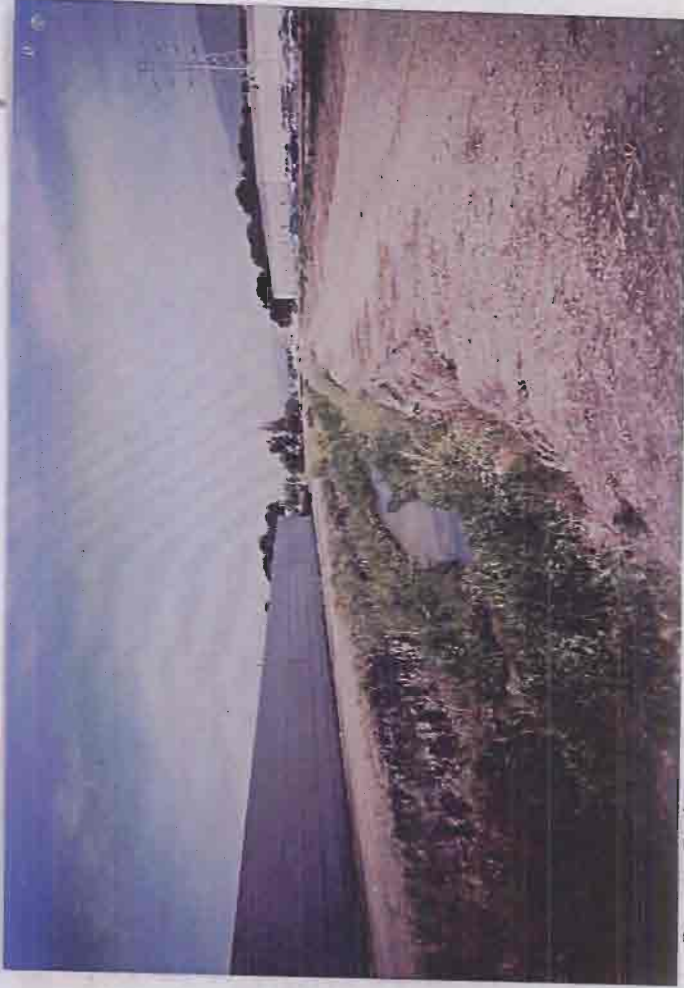
Berryessa Creek
Green Belt



Berryessa Creek
Upstream of Morrill Ave.



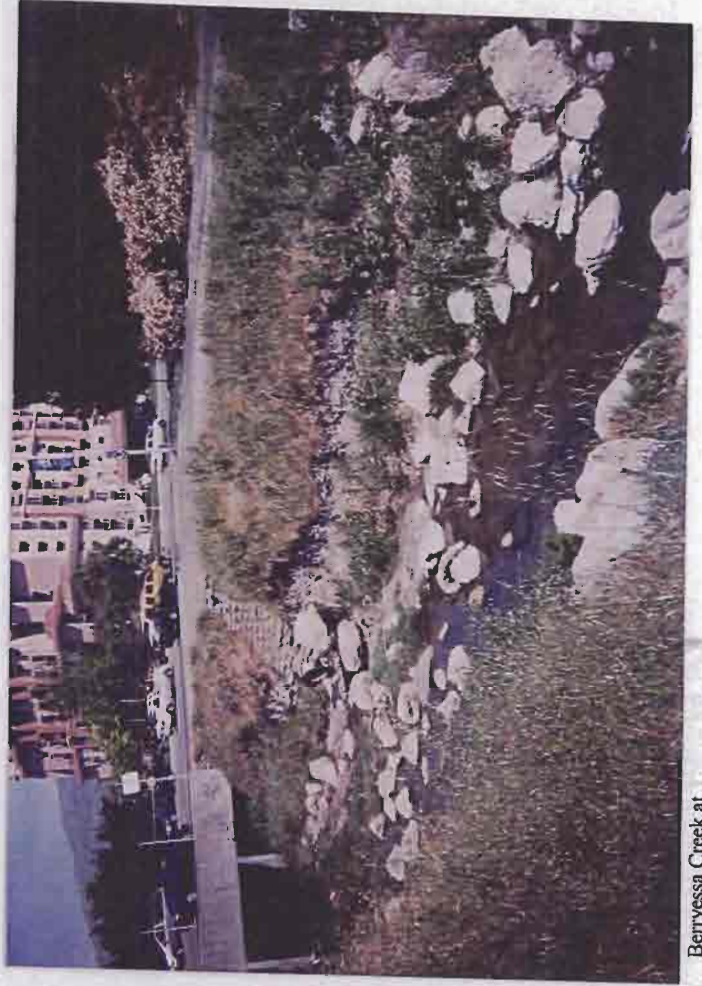
Berryessa Creek
Downstream of I-680



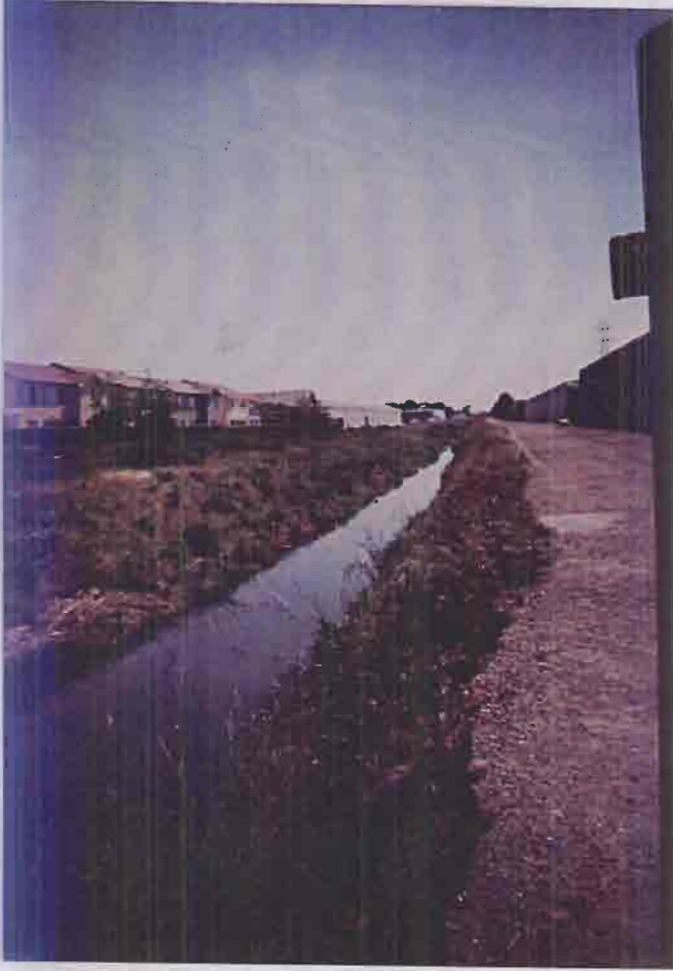
Berryessa Creek
at Yosemite Dr.



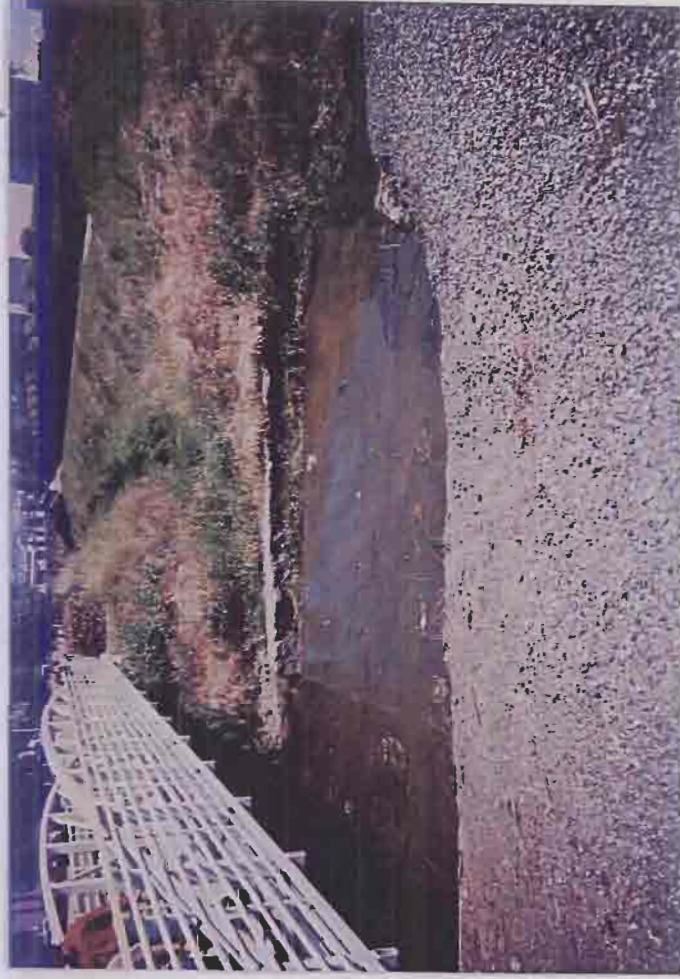
Berryessa Creek
at Yosemite Dr.



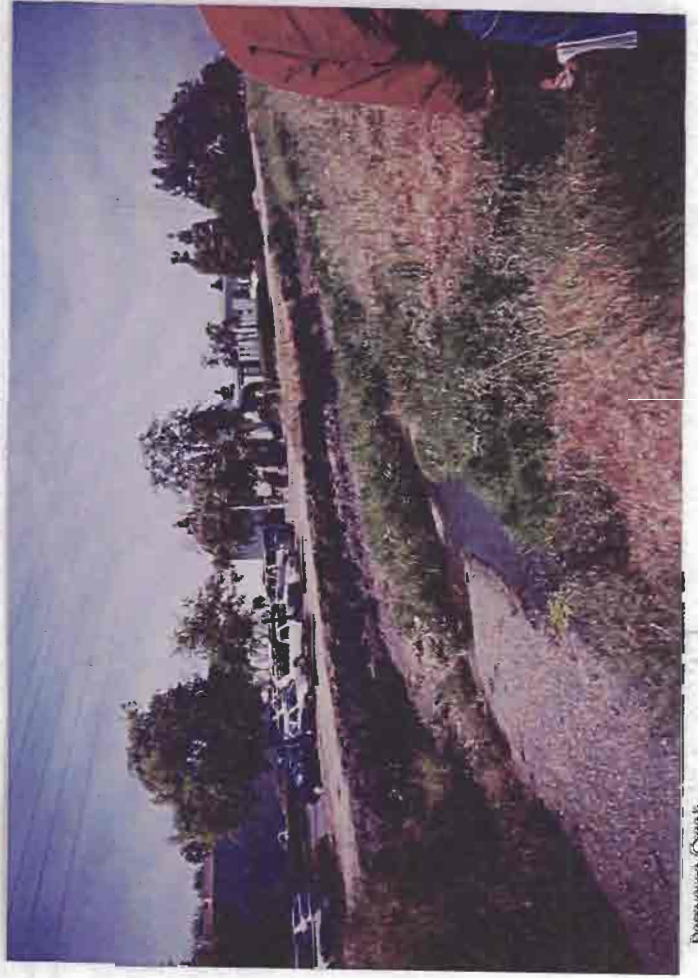
Berryessa Creek at
Ames Ave.



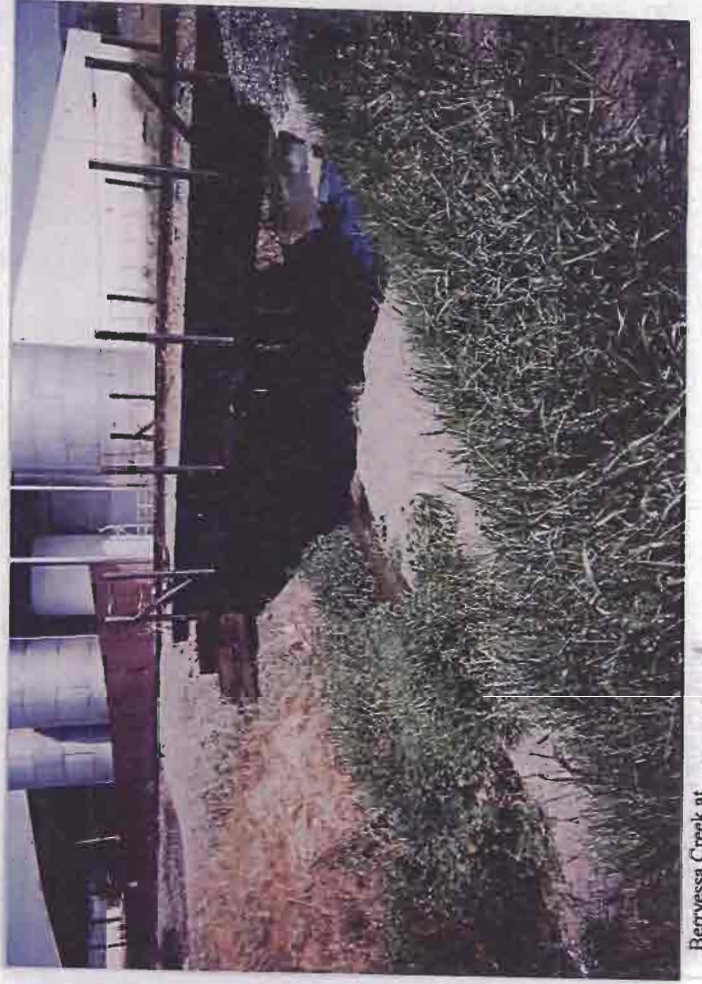
Berryessa Creek at
Los Coches



Berryessa Creek at
Los Coches



Berryessa Creek



Berryessa Creek at
RR Crossing

Berryessa Creek Project

Santa Clara County

Appendix A: Environmental

Part II

Water Temperature Monitoring Report

DRAFT
BERRYESSA CREEK
WATER TEMPERATURE MONITORING
NOVEMBER 2001 – NOVEMBER 2002

March 2003

Coyote Watershed Program
Santa Clara Valley Water District

and

US Army Corps of Engineers
Sacramento District

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1.0 INTRODUCTION

1.1. Project Background

A general re-evaluation study of the December 1993 General Design Memorandum (GDM) for flood protection on Coyote and Berryessa Creeks is being jointly conducted by the Santa Clara Valley Water District (SCVWD) and the U.S. Army Corps of Engineers (Corps). The purposes of this study are to reduce flood damage to populated areas, provide environmental improvements, reduce maintenance requirements, improve fish passage, and increase recreational opportunities, as feasible. A General Re-evaluation Report (GRR) is to be prepared to address the goals and objectives mentioned in the General Re-evaluation Study, and is to include an Environmental Impact Statement (EIS). The GRR/EIS will comply with all applicable laws and regulations and be fully coordinated with other federal, state, and local agencies.

In order to fulfill the requirements of the EIS, a detailed description of existing environmental conditions is necessary. However, existing data were unavailable for many environmental characteristics of Berryessa Creek. For this reason, a number of aquatic, riparian, and wildlife assessments have been conducted to document the baseline conditions. These baseline conditions will provide a standard for comparison of future conditions with project implementation, which will be expected to meet or improve existing conditions. In particular, this report provides baseline temperature characteristics for Berryessa Creek over a one-year period from November 2001 through November 2002.

1.2. Project Location

The Berryessa Creek drainage basin covers 22 square miles in northeastern Santa Clara County, California. Flowing westerly from its headwaters in the Diablo Range, it begins approximately 2000 feet above mean sea level. The creek flows west through the cities of San Jose and Milpitas, and then turns northward and drains into Lower Penitencia Creek, which is a tributary to Coyote Creek that flows into the San Francisco Bay. The basin consists of flat valley and foothill areas, which have been urbanized rapidly. The project area for the study encompasses a 4.5-mile (7.2 km) length of Berryessa Creek, beginning approximately 600 feet (182 m) upstream of Old Piedmont Road and ending at Calaveras Boulevard (Hwy 237).

1.3. Project Objectives

The objective of water temperature monitoring is to provide a baseline of water quality conditions within Berryessa Creek. Aquatic species are restricted to specific temperature ranges. Alterations to Berryessa Creek for the purpose of flood control have the potential to disturb thermal regimes, resulting in loss of stream productivity and fish use. Documentation of water temperature baseline conditions will provide the information needed to determine the existing condition of Berryessa Creek, as well as protect it from

potential adverse effects associated with future proposed actions as a result of the general re-evaluation study.

2.0 METHODS

Berryessa Creek was divided into 3 stream reaches based on physical and biological habitat characteristics and also on the proposed project location. The first reach was located at the upstream end of the project area, the second reach included the remaining project area, and the third reach was downstream of the project area. Temperature monitoring was conducted within each of these 3 reaches.

Reach 1. This reach includes the upper 600 feet of the project area, starting from Old Piedmont Road and extending upstream. This portion of the creek runs through the foothills of the Diablo Range and is the least modified reach. This reach generally has intermittent flow, although water may be present in the larger pools during the low-flow season.

Reach 2. This is the middle reach, which encompasses the remainder of the project area. It begins at Old Piedmont Road and continues downstream to the Calaveras Boulevard crossing. This reach includes both the greenbelt area comprised of natural stream habitats and a long length of highly modified channel with concrete or high dirt banks and significant deposits of sand and gravel in the channel bed. This reach does not have perennial flow.

Reach 3. This reach includes the remaining length of the creek from Calaveras Boulevard to its confluence with Lower Penitencia Creek and Coyote Creek. This reach is entirely downstream of the project area. This reach is comprised of highly modified channel, although perennial flow is present throughout most of the reach due to irrigation runoff and other discharges throughout the low-flow season. The lower end of this reach is tidally influenced.

A total of 6 gauges were placed and gauge locations are described in Table 1. Five gauges were within the project area and the sixth gauge was downstream of the project area. Multiple gauges were used to assure the best potential for obtaining year-round water temperature data and to minimize loss of data due to vandalism or other unforeseen circumstances.

Initial gauge deployment occurred on November 15, 2001. Optic Stow-Away Continuous Recording Temperature Gauges were used for this study. Gauges were programmed to record every 30 minutes. Temperature gauge recording memory allowed data to be collected continuously for 5-month long intervals. Within the sampling period of one year, data were downloaded from the gauges a total of 3 times, using BoxCar® Pro 4 software. The first recording period extends from November 15, 2001 to March 22, 2002. The second period ended on August 21, 2002. The final period ended with final gauge collection on November 19, 2002. Temperature data were then imported into Microsoft Excel format for graphing and analysis.

The gauges were placed within the deepest point of the creek, pools or thalweg, at the time of deployment in order to assure submergence of gauges during even low flow periods. Gauges were placed within PVC casings, which were drilled with several holes to allow water flow-through, and locked to prevent theft. The PVC casings were then secured to rebar posts and locked to a nearby tree or other permanent feature using chains.

| Table 1. Temperature monitoring gauge locations in Berryessa Creek. | | |
|--|---|--|
| Gauge | Description/ Latitude and Longitude | Location |
| BRY1 | Upstream End of Project Area N37°27.309', W121°51.206' | Southeast of Arlen Court, approximately 400 feet upstream of Old Piedmont Road |
| BRY2 | Upstream End of Project Area N37°25.267', W121°51.277' | Southeast of Arlen Court, approximately 200 feet upstream of Old Piedmont Road |
| BRY3 | Middle Project Area N37°24.547', W121°53.916' | Approximately 200 feet downstream of the footbridge at Berryessa Creek Park |
| BRY4 | Middle Project Area N37°24.506', W121°52.124' | Upstream of the concrete channel located just upstream of Morrill Road |
| BRY5 | Downstream End of Project Area N37°25.969', W121°53.547' | Between Los Coches Street and Calaveras Boulevard |
| BRY6 | Downstream of Project Area N37°26.129', W121°53.604' | Beneath Hillview Drive bridge |

3.0 RESULTS AND DISCUSSION

Low flow monitoring was conducted concurrent with temperature monitoring. Intermittent and low flow conditions resulted in collection of water temperature data for only portions of the year at several sites. Upstream of Old Piedmont Road, the creek is intermittent, with flows present from November to mid-June. Throughout the greenbelt area, flows were intermittent and typically occurred only after a rainfall event. At the downstream portion of the monitored creek, near Calaveras Boulevard, the creek flows year-round.

Data were most reliably available from gauges BRY 1, 2, 5 and 6. However, the most reliable data from each reach of the creek were taken from a single gauge. BRY 1 is most representative of Reach 1, BRY 5 provided the most data for Reach 2, and BRY 6 provided the most reliable data for Reach 3.

Water temperatures ranged from a minimum of 38.3°F to a maximum of 84.7°F throughout the entire creek for the year. Temperatures in the upper reach were several degrees cooler than in the lower reaches on average, while the lower reaches had little measurable difference between them. In fact, BRY 5 and 6 temperatures were quite similar, likely due to their close proximity at the lower reaches of the creek.

Average summer temperatures, measured from June 21 to September 19, ranged from 59.8°F to 84.7°F. Winter temperatures, measured from December 21 to March 20, ranged from 38.3°F to 71.3°F. A summary of temperatures at each reach has been provided in Table 2. Average, maximum, and minimum temperatures for seasonal periods is provided in Tables 3 and 4. Monthly average, minimum, and maximum temperatures are represented in Figures 1 and 2.

| Table 2. Water temperature average, maximum, and minimum °F (°C) by reach. | | | | |
|---|--------------|----------------|----------------|----------------|
| Reach | Gauge | Average | Maximum | Minimum |
| Upper | BRY 1 | 54.5 (12.5) | 78.2 (25.7) | 38.3 (3.5) |
| Middle | BRY 5 | 62.6 (17.0) | 84.7 (29.3) | 42.8 (6.0) |
| Lower | BRY 6 | 62.6 (17.0) | 84.0 (28.9) | 42.4 (5.8) |

| Table 3. Summer¹ average, maximum, and minimum temperature °F (°C) by reach. | | | | |
|--|--------------|----------------|----------------|----------------|
| Reach | Gauge | Average | Maximum | Minimum |
| Upper | BRY 1 | n/a | n/a | n/a |
| Middle | BRY 5 | 69.7 (20.94) | 84.7 (29.26) | 59.8 (15.46) |
| Lower | BRY 6 | 69.9 (21.09) | 80.5 (26.92) | 60.7 (15.97) |
| ¹ Period between June 21 and September 19, 2002. | | | | |

| Table 4. Winter (steelhead ESU spawning period¹) average, maximum, and minimum temperature °F (°C) by reach. | | | | |
|--|--------------|----------------|----------------|----------------|
| Reach | Gauge | Average | Maximum | Minimum |
| Upper | BRY 1 | 48.3 (9.02) | 57.5 (14.17) | 38.3 (3.48) |
| Middle | BRY 5 | 55.1 (12.85) | 70.8 (21.57) | 42.8 (5.99) |
| Lower | BRY 6 | 54.7 (12.60) | 71.3 (21.81) | 42.4 (5.76) |
| ¹ Period between December 21, 2001 and March 20, 2002 | | | | |

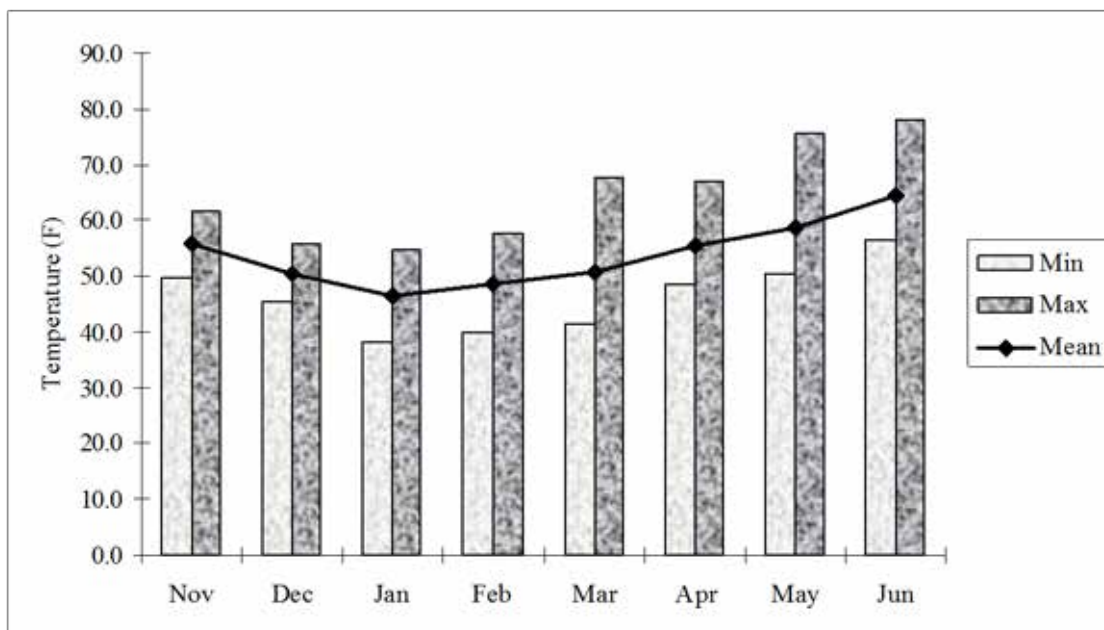


Figure 1. Station BRY 1 Temperature Fluctuation.

Monthly minimum, maximum, and average temperatures for BRY 1, representative of the upper reach of Berryessa Creek. Monitoring began November 15, 2001 and flows ended at this gauge location on June 18, 2002.

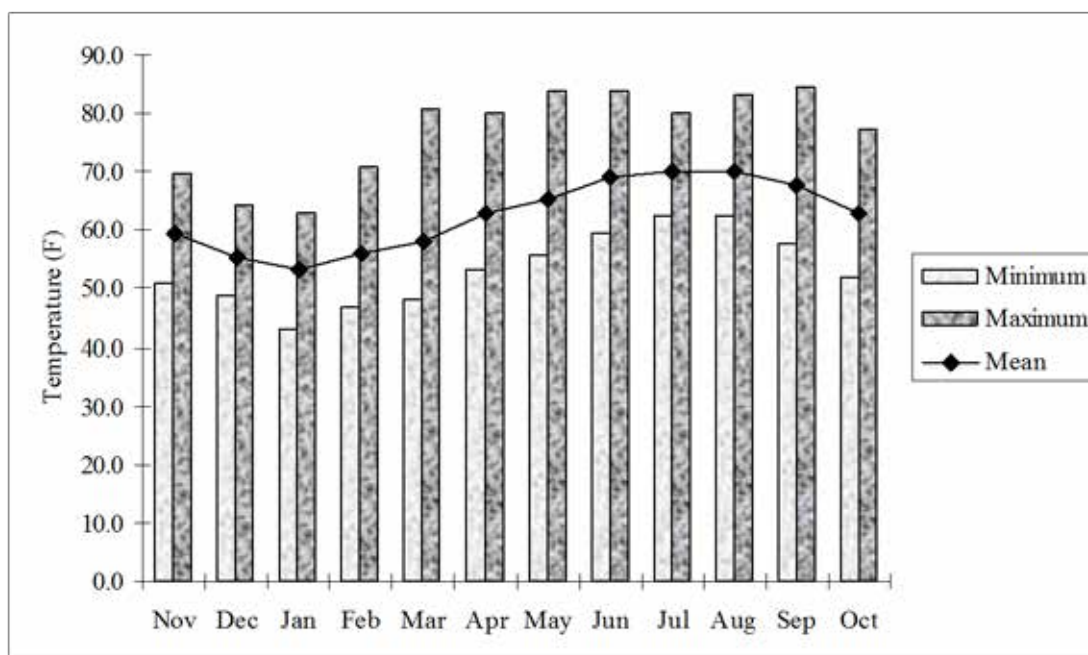


Figure 2. Station BRY 5 Temperature Fluctuation.

Monthly minimum, maximum, and average temperatures for BRY 5, representative of the lower reaches of Berryessa Creek. Monitoring began November 15, 2001 and ended November 19, 2002.

3.1. Reach 1. Upstream End of Project Area

Data from BRY 1 was available from the time of initial deployment until seasonal flow at the gauge ended in June. The last date of measurable flow occurred on June 18. As a result, data between November 15 and June 18 were analyzed. The average temperature in the upper reach was 54.5°F, with a maximum of 78.2°F and a minimum of 38.3°F. These temperatures are extremely high for the period of data collection, considering that it does not reflect summer high temperatures. Average cooler temperatures, or those below 55°F, occurred between January and April. The months of May and June both had average temperatures above 55°F. Maximum temperatures reach 55°F or above for all months. The highest maximum temperatures occur in May and June and are between 70 and 80°F.

At the BRY 2 gauge location, seasonal flow ended approximately one month earlier in the year than at BRY 1. Because data from BRY 2 represented a shorter time period, data from BRY 1 were selected to represent the upper reach. Temperatures were generally within 2 degrees of BRY1.

Figure 3 and 4 below show the temporal fluctuation in temperatures measured within the upper reach. The increased fluctuation that occurs between June and the end of the sampling period (November 2002) indicates the gauge was measuring air temperature and not water temperature. During this period there are a few periods of decreased fluctuation, which indicate that an intermittent flow occurred, likely as a result of a rainfall event.

3.2. Reach 2. Middle of Project Area

Gauges BRY 3, 4, and 5 were located within this reach, and both gauges BRY 3 and 4 were located within the greenbelt portion of the reach. BRY 5 was located at the downstream end of the project area. BRY 3 and 4 did not provide reliable water temperature data. BRY 5 provided continual water temperature recordings throughout the entire monitoring period of one year. BRY 5 provided data very similar to that of the lower reach gauge (BRY 6). Average water temperature here was 62.6°F, with a maximum of 84.7°F, and a minimum of 42.8°F.

Average monthly temperatures remain at 55°F or below for the months between December and February. The remainder of the year, average monthly temperatures are between 55 and 70°F. Maximum temperatures reach above 60°F for all months. Temperatures above 70°F are reached between February and October, and temperatures above 80°F are reached between March and September.

Data from BRY 3 and 4 only intermittently recorded water temperatures. Low flow monitoring at the greenbelt indicates that flows occurred sporadically. As a result, it is difficult to distinguish the measurements that reflect water temperature from those that

reflect air temperature. Figures 5 and 6 below show the extreme fluctuations of BRY 3 and 4.

Downstream of the greenbelt area, the channel is incised and there are several drop structures present. Significant deposits of sand and gravel are located in the channel. Flows appear to occur only during rainfall events and may be subsurface during a majority of the year. A number of warm, stagnant pools have formed as a result of the existing drop structures, which trap water, and intermittent flows, which fail to flush water downstream. This area is also subject to a high level of urban runoff, which may contribute to poor water quality. Gauges were not placed within pools formed by drop structures.

During the second recording period, the casing of BRY 4 was destroyed and the gauge and all collected data for the period were lost. Again, fluctuating temperature measurements for this gauge indicates that water temperatures were not being regularly monitored. For BRY 4, which was observed to be buried beneath several inches of sediment during much of the monitoring period, data are likely a reflection of the temperature of the channel substrate.

3.3. Reach 3. Downstream of Project Area

BRY 6 recorded water temperature throughout the entire monitoring period. The average temperature was 62.6°F for the year, while the maximum temperature was 84.0°F and the minimum was 42.4°F. Although flows are year-round at this reach, average temperatures were extremely high. Average and maximum monthly temperatures are not significantly different from those of BRY 5. Figures 7 and 8 show the recorded temperatures at BRY 6. This is likely due to the close proximity of the gauges.

3.4. Effects of Temperature on the Aquatic Ecosystem

Water quality, and specifically temperature, plays a significant role in determining the species assemblage present in an aquatic ecosystem. Coyote Creek and its tributaries have been identified as having beneficial uses for warm freshwater habitat, cold freshwater habitat, wildlife habitat, preservation of listed species, fish migration, and fish spawning. Historically, these creeks supported a population of steelhead trout, along with a native assemblage of cold and warm water fish. Berryessa Creek may have once provided a migration pathway and spawning habitat for steelhead trout during seasonal flows. However, urbanization of the area has resulted in the removal of the riparian zone and floodplain wetlands, and introduced poor water quality from stormwater and industrial runoff, which has decreased the capacity of the creek to support fish and wildlife species.

Currently, within Coyote Creek, non-game fish species are supported, which are more tolerant of poor water quality conditions and low seasonal flows. Native fish present include hitch, prickly sculpin, Pacific lamprey, and possibly threespine stickleback (USACE 1988). Introduced species are now common and include carp, goldfish, and

mosquito fish (*ibid*). Although studies have not evaluated fish presence in Berryessa Creek, it is likely that fish diversity is similar to that of Coyote Creek. The Central California Coast Steelhead Trout Evolutionarily Significant Unit (ESU) has been listed as threatened pursuant to the Federal Endangered Species Act (Federal Register, August 2, 1999) and the Coyote Creek watershed has been designated as Critical Habitat for this ESU (Federal Register, February 16, 2000). Only winter run steelhead are found in this ESU (NOAA 1996).

Steelhead prefer temperatures between 50-55°F (10 –13°C) (Bell 1986). Long-term exposure to sub-lethal temperatures (55-77°F, 14-25°C) weakens trout and leaves them more susceptible to disease and predation. Temperatures above 77°F (25°C) are considered to be lethal. On the average, the downstream reaches of Berryessa Creek fall within the sub-lethal temperature range. Temperatures at the upper reach fall just under the lower limit of the sub-lethal range. However, all reaches within the creek have recorded temperatures lethal for steelhead.

Adult steelhead are likely only to be present November-March, during spawning each year, while juvenile fish will migrate downstream by May or June. December and January are the only months at the lower reaches of Berryessa Creek that do not have sustained sub-lethal temperatures.

However, high temperatures are not likely to be the current limiting factor for fish migration and spawning in Berryessa Creek. A number of fish passage barriers are present, in the form of drop structures placed for erosion and flood control, as well as the presence of low or no-flow conditions. Even if man-made barriers are removed, intermittent flows in Reach 2 would prevent upstream migration of fish during most of the year. During wetter years, fish migration might be possible.

Temperatures also affect the assemblage of benthic macroinvertebrates and amphibians. Benthic organisms, which provide a prey base for fish and wildlife species, tend to thrive in cooler waters that have higher levels of dissolved oxygen. Native amphibians, such as endangered red-legged frogs, are also adapted to cooler water, while non-native species, such as bullfrogs, thrive in warmer waters.

4.0 CONCLUSIONS

Average yearly water temperatures within Berryessa Creek are high, with several months of the year sustaining average sub-lethal temperatures for steelhead. The lower reaches of the creek remain within sub-lethal temperatures for steelhead throughout the summer period. Average winter month temperatures tend to remain within suitable ranges for steelhead, with averages beneath 55°F (13°C) at all reaches, but infrequent periods of higher sub-lethal temperatures occur. Maximum temperatures during summer months often reach lethal ranges for steelhead at both the upper and lower reaches.

Water temperature, and associated dissolved oxygen levels, may be a limiting factor to production of macroinvertebrates, amphibians, or other aquatic species. However, the

current limiting factor to anadromous fish spawning is the presence of several man-made fish passage barriers, as well as the seasonal nature of stream flow.

High water temperatures at Berryessa Creek primarily occur as a result of solar gain in areas where riparian vegetation is degraded or absent. A lack of riparian vegetation or other stream cover results in direct exposure to sunlight, which increases water temperatures. Slow, low flow, or pooled waters can increase in temperature rapidly and significantly when exposed to sunlight.

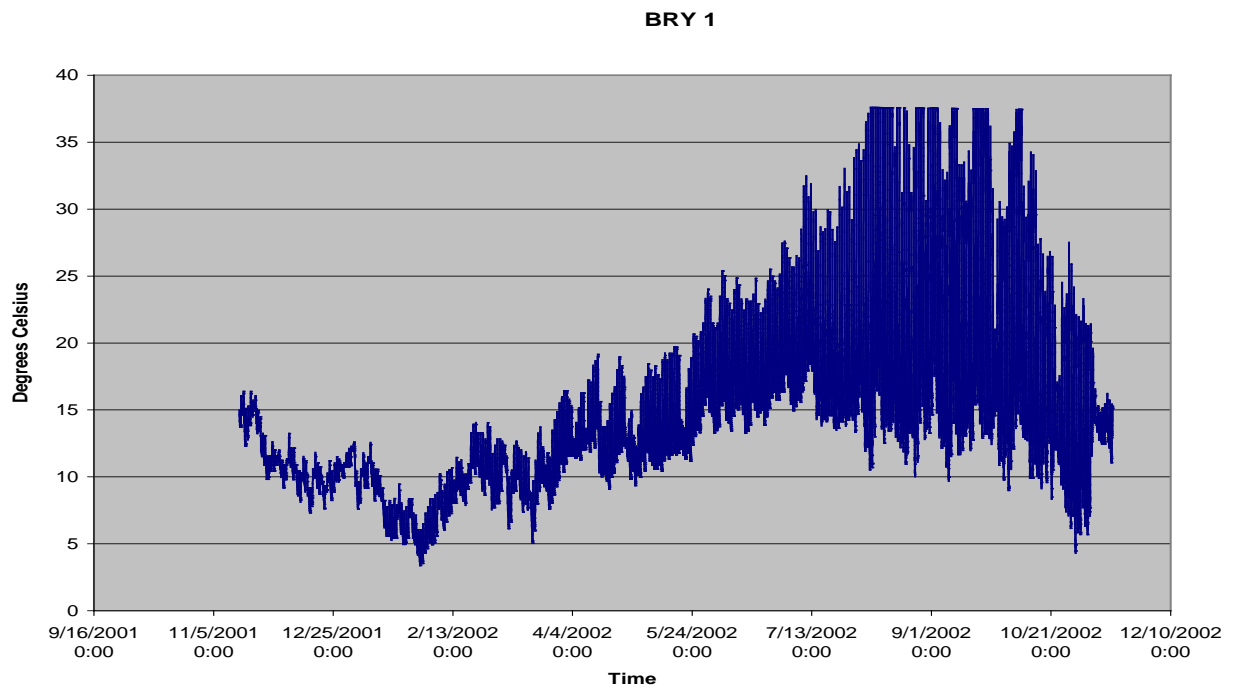


Figure 3. Water temperatures at BRY 1 in °C.

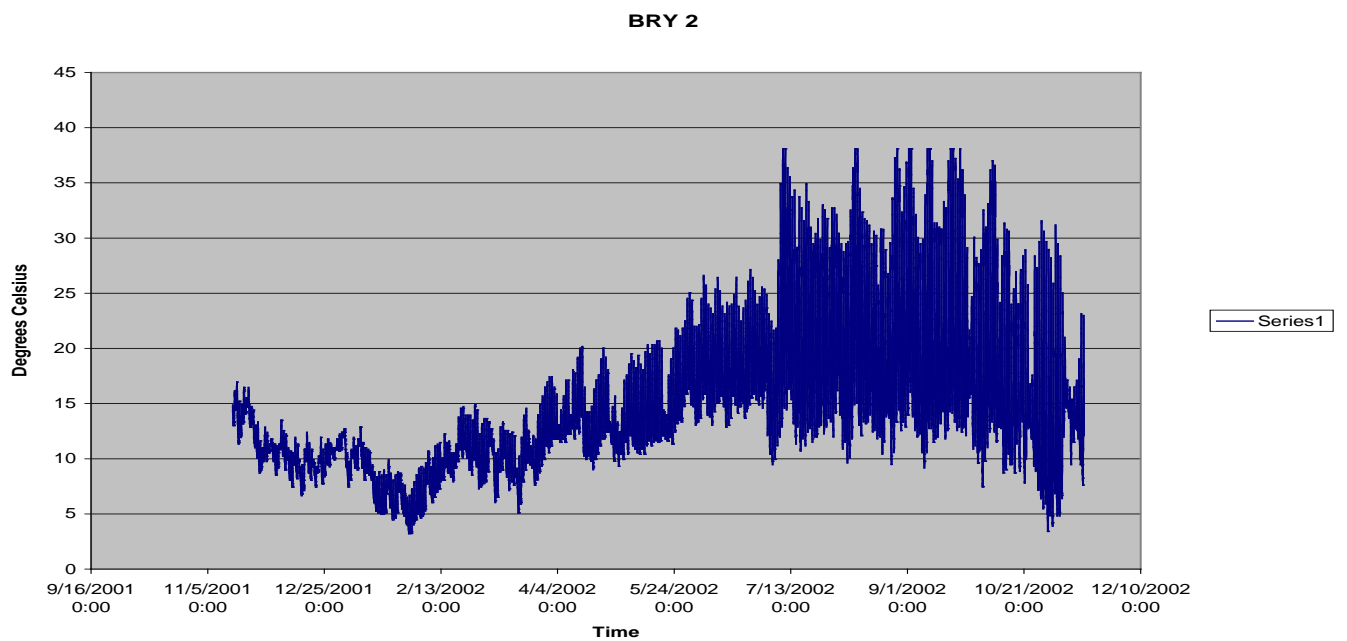


Figure 4. Water temperatures at BRY 2 in °C.

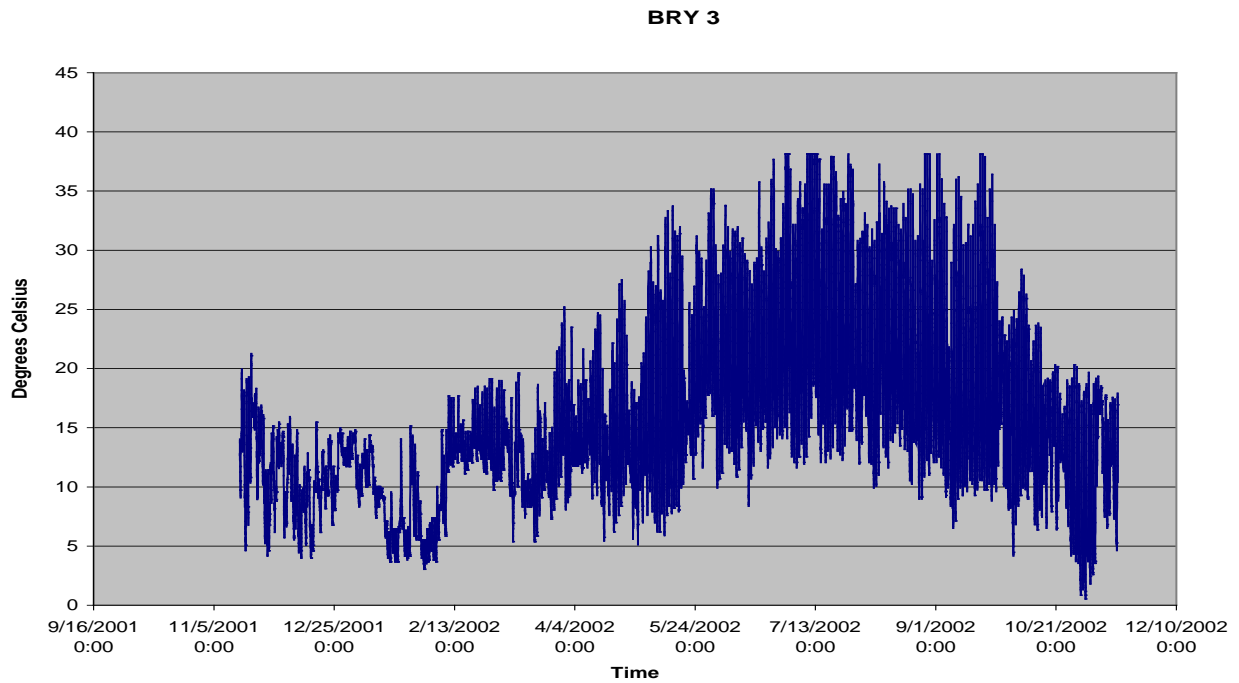


Figure 5. Water temperatures at BRY 3 in °C.

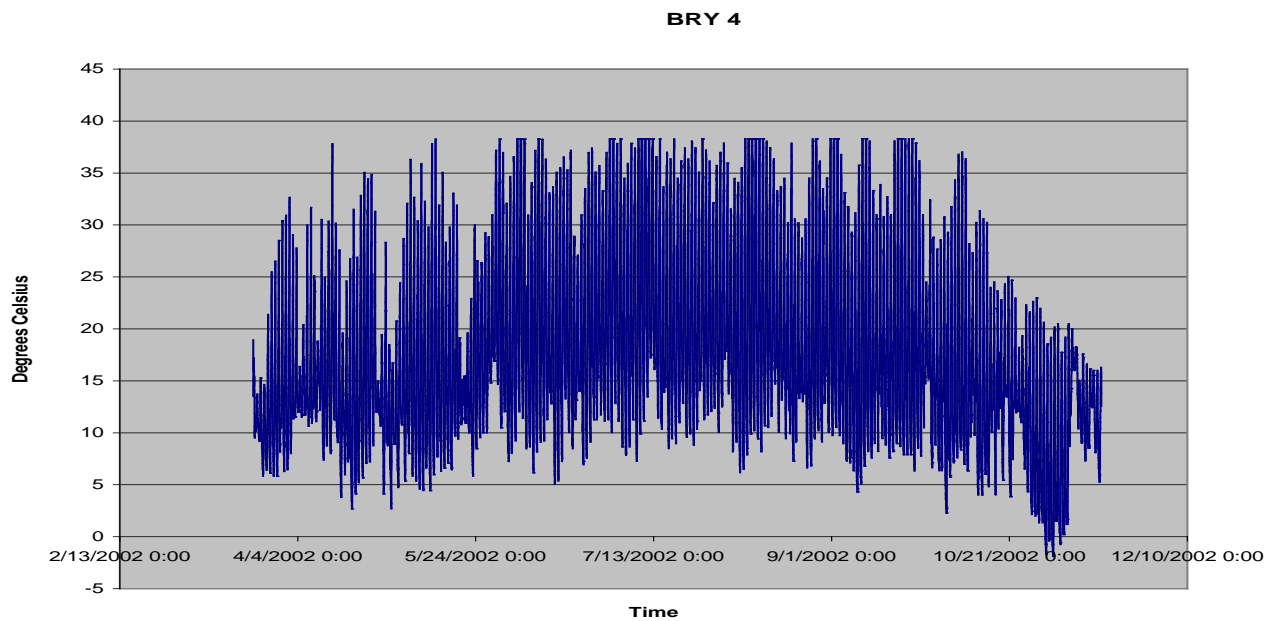


Figure 6. Water temperatures at BRY 4 in °C.

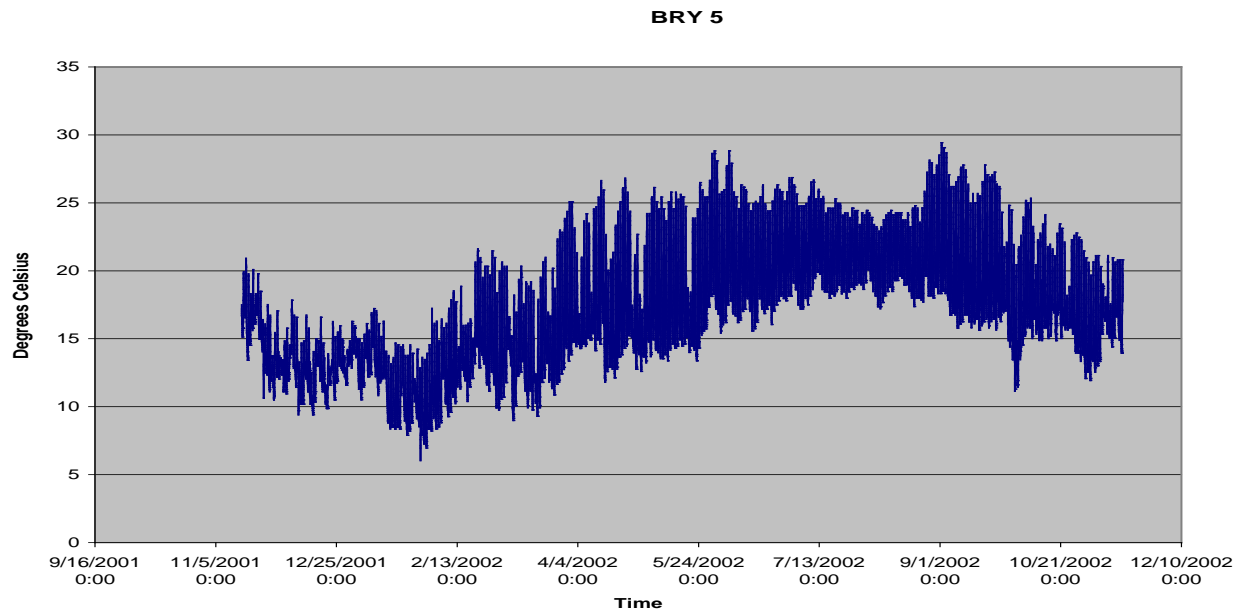


Figure 7. Water temperatures at BRY 5 in °C.

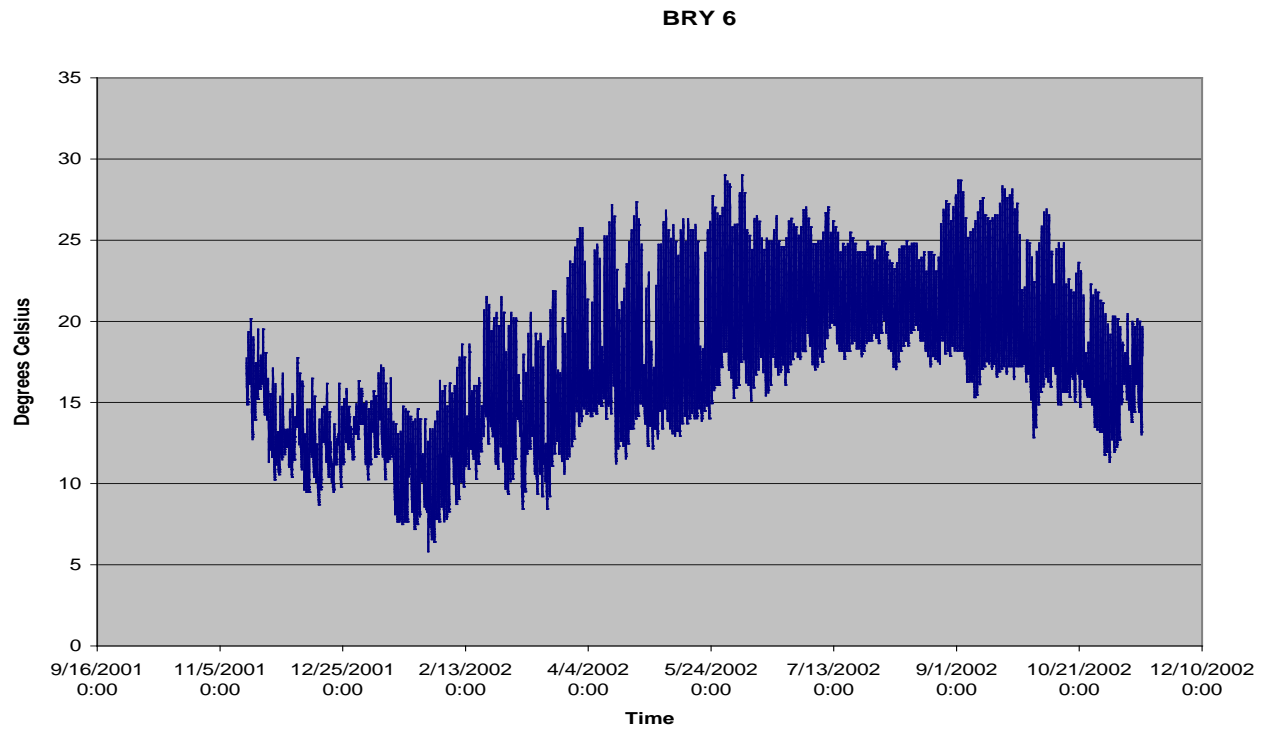


Figure 8. Water temperatures at BRY 6 in °C.

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Berryessa Creek Project

Santa Clara County

Appendix A: Environmental

Part III

Habitat Assessment and Surveys for the California Red-Legged Frog

**HABITAT ASSESSMENT AND SURVEYS FOR THE
CALIFORNIA RED-LEGGED FROG (*Rana draytonii*)
AND FOOTHILL YELLOW-LEGGED FROG (*Rana boylei*)
ON THE UPPER BERRYESSA CREEK DRAINAGE,
SAN JOSE, CALIFORNIA**

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EXECUTIVE SUMMARY

Habitat assessments and ocular surveys were conducted for California red-legged frogs (CRLF; *Rana draytonii*) and foothill yellow-legged frogs (FYLF; *Rana boylei*) on 16, 24, and 31 March, 10 and 30 April, 17 May, and 20 and 27 July 2006, on the upper Berryessa Creek drainage in San Jose, Santa Clara County, California, to determine if these species were potentially present within and upstream of the proposed U.S. Army Corps of Engineers and Santa Clara Valley Water District Berryessa Creek Project site. The surveys for CRLFs were conducted using the most recent U.S. Fish and Wildlife Service survey protocol. The entire length of Berryessa Creek was surveyed from Morrill Avenue, upstream to a major fork in the drainage at 750 feet (approximately 0.5 miles east of the San Jose City Boundary). Although there are no known records for CRLFs or FYLFs within the drainage, and no frogs of either species were observed on the creek itself, a breeding population of CRLFs was found in 3 of 5, spring-fed, ponds located in the middle part of the drainage near the eastern San Jose City Boundary, about 1.25 miles upstream of the proposed project area. The ponds are located below a major spring on a hillside approximately 160 feet above the creek and 800 feet south of the creek. Because of the pond's distance from the creek, the lack of deep (>2-feet) pools in the creek, the intermittent nature of the creek (it flows less than 7 months out of the year during normal rainfall years), and the presence of predators such as raccoons (*Procyon lotor*), Berryessa Creek proper is unsuitable for CRLFs and FYLFs and they do not presently inhabit this stream. Instead, Pacific treefrogs (*Hyla regilla*) and California toads (*Bufo boreas halophilus*), which are much more suited to intermittent and shallow aquatic habitats, are present in Berryessa Creek throughout the mainstream where they successfully breed at a number of locations within the drainage. Since CRLFs and FYLFs do not inhabit the main channel of Berryessa Creek, CRLFs are unable to colonize the stream course, and the project site is 1.25 miles away from the nearest known CRLF population, the proposed project in upper Berryessa Creek will not have any adverse effects on these two species.

INTRODUCTION

The Berryessa Creek Project is located in Santa Clara County, California, within the City of San Jose along a section of Berryessa Creek that runs from Morrill Avenue upstream to just above Old Piedmont Road (Figure 1). The U.S. Army Corps of Engineers and their local partner, the Santa Clara Valley Water District, propose to rechannelize portions of the stream and enhance the riparian corridor in order to provide enhanced flood protection for the Cities of San Jose and Milpitas. The project will also greatly enhance urban wildlife habitats (both aquatic and terrestrial) in Berryessa Creek Park and the greenbelt area. Because the area lies within the native range of the California red-legged frog (CRLF; *Rana draytonii*) and the foothill yellow-legged frog (FYLF; *Rana boylei*) [see Jennings et al. 1997, 1999], and there are known records for these two species within 5 miles of the project site (California Department of Fish and Game 2005), the following ocular surveys and habitat assessments were conducted to determine if there was any actual or potential breeding, feeding, movement corridors, and estivation/hibernation habitats for CRLF and FYLF. Per recent taxonomic changes with frog species in California, I follow Jennings (2004) and Shaffer et al. (2004) and use the scientific name “*Rana draytonii*” for the CRLF. In almost all other documents and field guides, this frog is stated as the subspecies “*Rana aurora draytonii*” (e.g., see Stebbins 2003).

STUDY AREA

The portion of upper Berryessa Creek that was surveyed for frogs was from Morrill Avenue upstream to a major fork in the drainage at 750 feet elevation (approximately 0.5 miles east of the easternmost San Jose City Boundary) [Figure 1]. This includes portions of the stream that flows through the greenbelt and Berryessa Creek Park and the other urbanized areas of the extreme northeastern part of San Jose. Upstream of Old Piedmont Road, the creek flows through a brush and tree-lined canyon that (except for the bluegum (*Eucalyptus globulus*) forest just above Old Piedmont Road), is largely used for livestock grazing. Although the stream channel contains areas of bedrock and cobble, there is a

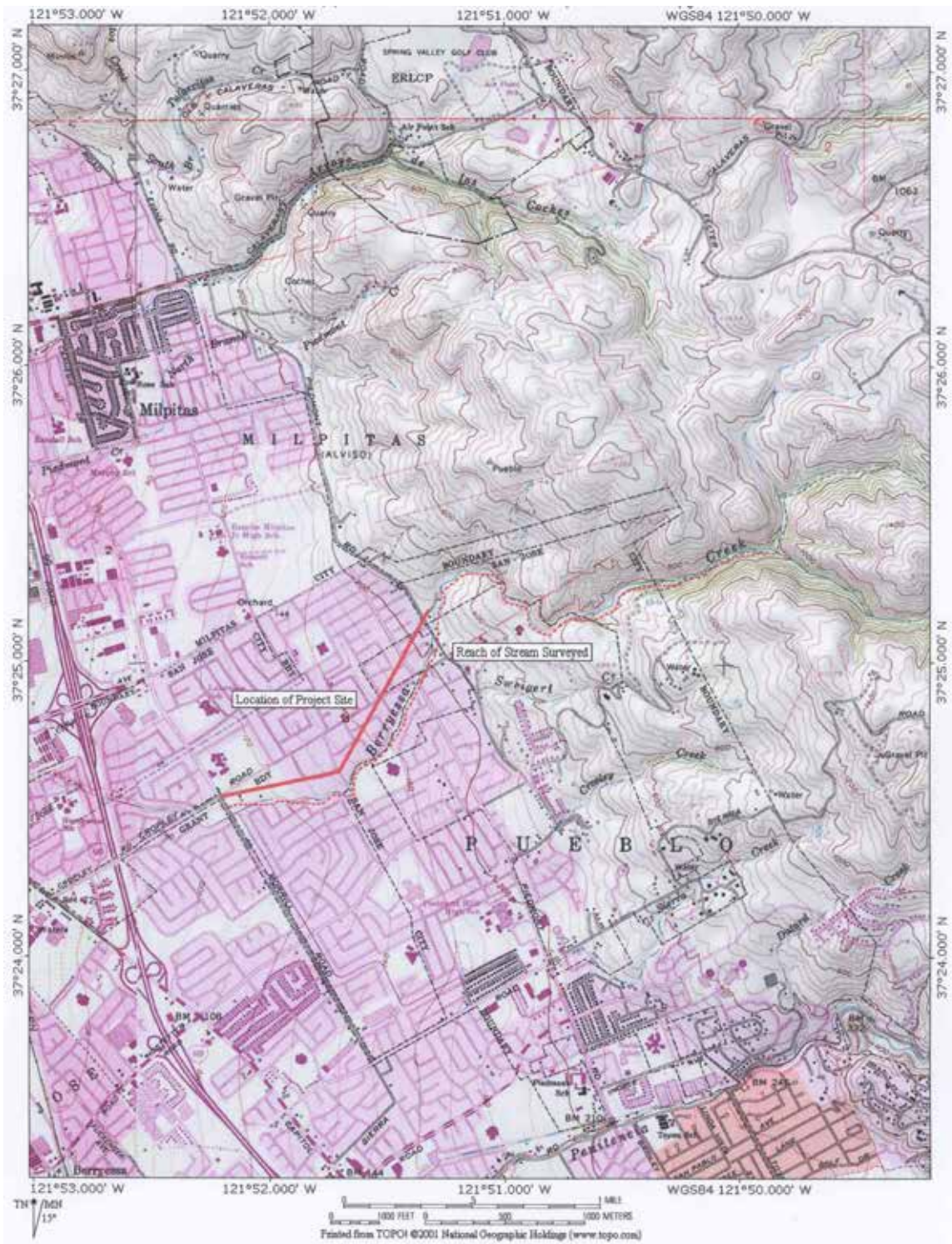


Figure 1. Location of the upper Berryessa Creek watershed in northeastern San Jose, project site location, and the reach of the stream surveyed for frogs.

great deal of fine sediment in the bed load with the result of almost no pools greater than 2 feet deep. Instead, most pools within the main creek channel are less than 1 foot deep. The upper part of the study area is relatively remote, although there are a number of dirt roads that reach houses located on the slopes within the upper Berryessa Creek drainage. Many of the dwellings contain orchards, stock ponds, and ornamental trees that contrast greatly with the native vegetation on the hillsides. Only a single dirt road reaches the bottom of the upper part of Berryessa Creek that I surveyed.

MATERIALS AND METHODS

The habitat assessment and ocular surveys for the CRLF followed guidelines as set forth by the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 2005). The habitat assessment and ocular surveys for FYLF followed those successfully used by me in other studies (e.g., see Jennings and Hayes 1994 and Jennings et al. 1999). The entire study area was surveyed for both species during daylight hours on 16 March, 17 May, and 27 July 2006, and at night on 24 and 31 March, 10 and 30 April, and 20 July 2006. Surveys were conducted as per protocol survey standards for CRLFs (U.S. Fish and Wildlife Service 2005) and my long-term experience with both species (e.g., see Jennings and Hayes 1994). A flashlight was used to locate the eye shines of frogs during nighttime hours and I repeatedly listened for calling male CRLFs and FYLFs using the identifications provided by Davidson (1995). Additionally, I conducted a habitat assessment for both species following an initial review of historical information previously gathered by me (see Jennings et al. 1997, 1999). All records for CRLFs and FYLFs within a 5-mile radius of the site were obtained and reviewed from the California Natural Diversity Database (California Department of Fish and Game 2005). These records are plotted on aerial photographs and determined if they were within potential movement corridors for CRLFs and FYLFs within the upper Berryessa Creek drainage.

CALIFORNIA RED-LEGGED FROG OVERVIEW

Federal listing status: Threatened. State listing status: Species of Special Concern.

On 15 January 1992, the CRLF was petitioned for listing as an endangered species by the U.S. Fish and Wildlife Service (Sorensen 1993) based on a 70% range reduction and continued threats to surviving populations (Miller 1994). The frog was subsequently listed as Threatened by the U.S. Fish and Wildlife Service on 23 May 1996 (Miller et al. 1996), with further recent revisions to critical habitat and management of this species (U.S. Fish and Wildlife Service 2006).

The CRLF is a large brown to reddish-brown frog that attains lengths up to 3.25-5.5 inches from the tip of the snout to the end of its vent. These frogs have prominent dorsolateral folds and diffuse moderate-sized dark brown to black spots that sometimes have light centers (Storer 1925, Jennings and Hayes 1994). The distribution of red or red-orange pigment is highly variable, but usually restricted to the belly and the undersurfaces of the thighs, legs and feet (Jennings and Hayes 1994). Frogs in southern California often have red only on the undersurfaces of the feet (Jennings pers. observ.). There are prominent dorsolateral folds, which are yellow or orange-colored in juveniles (Stebbins 2003). The groin has a distinct black mottling on a white or yellow background. The iris is dark brown with iridophores on the upper and lower portions of the iris (Jennings and Hayes 1994).

Larvae range in length from 0.55-3.15 inches in total length and have up to 2-3 upper and 3-4 lower tooth rows (Stebbins 2003). Newly hatched tadpoles generally are blackish in color, gradually changing to a brown background color with darker marbling or spots after a week or two of growth (Storer 1925).

This amphibian is the largest native frog in the state. There are data to support elevating the subspecies to a full species separate from the northern red-legged frog (*Rana aurora aurora*) [see Hayes and Miyamoto 1984, Hayes and Kremple 1986, Green 1985]. The large zone of intergradation along the Pacific slope of the North Coast Range reported by

Hayes and Kremples (1986) has been greatly contracted to a point in mid-Mendocino County by recent biochemical studies (Shaffer et al. 2004).

Life History and Ecology

CRLFs are pond-dwelling amphibians that generally live in the vicinity of permanent aquatic habitats including livestock ponds and pools in perennial streams (Jennings and Hayes 1994). The most optimal habitat is characterized by dense, shrubby riparian vegetation associated with deep (>2.3 feet), still, or slow-moving water (Hayes and Jennings 1988, Jennings 1988). The shrubby riparian vegetation that structurally seems to be most suitable for this frog is that provided by arroyo willow (*Salix lasiolepis*), although cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.) also can provide suitable habitat (Jennings 1988). Although CRLFs are found in ephemeral streams and ponds, populations cannot be maintained where all surface water disappears (Jennings and Hayes 1994). This frog is infrequent or absent in habitats where introduced aquatic predators such as green sunfish (*Lepomis cyanellus*), Louisiana red-swamp crayfish (*Procambarus clarkii*) and bullfrogs (*Rana catesbeiana*) are present (Hayes and Jennings 1986, 1988), probably because the larval stages are susceptible to such predators (Jennings and Hayes 1994).

Reproduction occurs at night in permanent ponds or the slack water pools of streams during the winter and early spring (late November-through April) after the onset of warm rains (Storer 1925, Hayes and Jennings 1988, Jennings and Hayes 1994). Males generally appear at breeding sites from 2-4 weeks before females (Storer 1925). At breeding sites, males typically call in small mobile groups of 3-7 individuals that attract females (Jennings and Hayes 1994). Females amplex with males and attach egg masses containing approximately 2,000-6,000 eggs to an emergent vegetation brace at depths usually from 3-4 inches deep (Storer 1925). Eggs hatch after 6-14 days (depending on the prevailing water temperature), and the resulting larvae require 3.5-7 months to attain metamorphosis (Storer 1925). Some tadpoles may also over winter (Fellers et al. 2001a). Juvenile frogs are about 1 inch (25.4 millimeters) long at metamorphosis and commonly

sun themselves during the day at the edge of the riparian zone next to the breeding site. As they grow, they gradually shift from diurnal and nocturnal periods of activity, to largely nocturnal activity (Hayes and Tennant 1986). During periods of rainfall, both juveniles and a few adults may disperse away from breeding sites and may be found some distance (up to 0.5 mile) away from the nearest water (Jennings, unpubl. data). Frogs found in the coastal drainages appear to be rarely inactive, whereas those found in interior sites probably hibernate (Storer 1925). Frogs generally reach sexual maturity in their second year for males and third year for females (Jennings and Hayes 1985). During extended periods of drought, frogs may take 3-4 years to reach sexual maturity (Jennings and Hayes 1994). Based on limited field data, CRLFs appear to live about 8-10 years in the wild (Jennings, unpubl. data).

CRLFs have declined largely due to habitat loss and the introduction of non-native aquatic predators such as green sunfish, red-swamp crayfish and bullfrogs (Jennings and Hayes 1994). It is possible that a pathogen also helped to eliminate frog populations in southern California during the 1970s (Fellers et al. 2001b). Recent work suggests that nitrate/nitrite pollution (Marco et al. 1999) and pesticide drift (Davidson et al. 2001, 2002) also may be responsible for frog declines in California.

CRLFs were historically found west of the Sierra Nevada crest from mid-Mendocino County and the vicinity of Redding, south into northwestern Baja California (Jennings 1995). There are documented records of CRLFs in the adjoining drainages of upper Penitencia Creek to the south (Jennings et al. 1997) and in adjoining drainages to the north (near Ed Levin County Park) in the California Natural Diversity Data Base (California Department of Fish and Game 2005). Although CRLFs are still present within suitable habitats in the hills to the east of San Jose, they have been largely eliminated by channelization of aquatic habitats and by raccoons, bullfrogs, and other introduced aquatic predators in the urbanized areas of the city.

FOOTHILL YELLOW-LEGGED FROG OVERVIEW

Federal listing status: None. State listing status: Species of Special Concern.

Although The Center For Biodiversity is currently putting together a petition to send to the U.S. Fish and Wildlife Service, this frog is presently listed as a “Species of Special Concern” by the California Department of Fish and Game (Jennings 2004). It has apparently disappeared from about 45% of its historic range in California due to habitat loss, the widespread introduction of aquatic predators such as fishes and bullfrogs, diseases (possibly introduced), and agricultural chemicals (Jennings and Hayes 1994; Jennings 1995; Davidson et al. 2002).

The FYLF is a moderate-sized, highly variably colored, frog that attains lengths up to ranges 1.5-3.25 inches from the tip of the snout to the end of its vent. The back is usually dark to light gray, brown, green, or yellow with a somewhat mottled appearance often with considerable amounts of brick or reddish pigment, and rough tubercled skin (Zweifel 1955; Jennings and Hayes 2005). A light band between the eyelids is normally present, often appearing as a pale triangle between the eyelids and the nose (Stebbins 2003). The distribution of yellow or yellow-orange pigment is variable, but usually restricted to the belly and the undersurfaces of the thighs, legs, and feet (Jennings and Hayes 1994).

Life History and Ecology

FYLFs are a stream-dwelling form that requires shallow, flowing water, apparently preferentially in small to moderate-sized stream situations with at least some cobble-sized substrate (Hayes and Jennings 1988, Jennings 1988). This type of habitat is probably best suited to oviposition (see Storer 1925, Fitch 1936, Zweifel 1955) and likely provides significant refuge habitat for larvae and postmetamorphs (Hayes and Jennings 1988, Jennings 1988). Streams utilized by frogs can be perennial or intermittent (Hayes and Jennings 1988, Kupferberg 1996a), but for the latter type, a permanent watercourse must be either immediately up- or down-stream, or in the nearby general area (Jennings, unpubl. data).

Adult FYLFs have been observed to breed from late March into early June (Storer 1925, Grinnell et al. 1930, Wright and Wright 1949). Breeding normally occurs following the period of high flows that result from rainwater and snowmelt, although other hydrologic factors such as water temperatures above 44.6°F may influence the timing of breeding and oviposition (Kupferberg 1996a, Van Wagner 1996). Male frogs attracting females typically call in small groups of 2-5 from within the cracks of underwater rocks and boulders (MacTague and Northen 1993), although there are observations of males calling above the water surface (MacTague and Northen 1993; Van Wagner 1996; Jennings, unpubl. data). At least part of the courtship activity occurs at night (Van Wagner 1996). Following amplexus, the females move to an oviposition site where at night they deposit an egg mass of 300-1200 eggs on the downstream side of cobbles and boulder over which a relatively gentle flow of water exists (Storer 1925, Fitch 1936, Zweifel 1955). Most egg masses are laid within about 1-foot of the surface of the water (Van Wagner 1996).

Eggs hatch within 5-31 days depending on water temperatures (Zweifel 1955, Kupferberg 1996b). Most larvae metamorphose into juvenile frogs after 3-4 months of development (Storer 1925, Zweifel 1955, Kupferberg 1996b), although there are observations of larvae metamorphosing in stream environments as late as October (Jennings 1988). Sexual maturity is probably reached in 2 years (Storer 1925, Van Wagner 1996); however, frogs of both sexes may reach sexual maturity in 1 year if food resources are sufficient (Jennings 1988). Based on limited field data, FYLFs appear to live about 3-4 years in the wild (Kupferberg 1996b, Van Wagner 1996).

FYLFs appear to move in and out of riparian zones during various parts of the year, as both juvenile and adult frogs have been found as far as 164 feet from the nearest watercourse (Nussbaum et al. 1983). While some of this movement may be due to flooding or other hydrologic events known to scour frogs downstream (Kupferberg 1996a, Lind et al. 1996, Van Wagner 1996), frogs may also be actively foraging away from riparian zones--based on the wide variety of terrestrial invertebrates found in some frog stomachs (Van Wagner 1996).

There is no approved protocol for surveying eggs, larvae, juveniles, adults, or calling males. Juvenile and adult frogs are easily observed during the spring and summer months (March-July) during daylight hours along stream courses (Zweifel 1955). Egg masses can be observed during about a 2-3 week window when frogs are actively breeding (Jennings, pers. observ.). Larvae can be dipnetted with practice during the summer months (Jennings, pers. observ.).

This frog was historically known to occur in most Pacific drainages from the Santiam River system in Mehama, Marion County, Oregon, south to the San Gabriel River system, Los Angeles County, California (Storer 1923, 1925; Fitch 1938; Marr 1943, Zweifel 1955), at elevations between near sea level to 6,700 feet (Jennings and Hayes 1994). There was an isolated outpost reported from the Sierra San Pedro Martir, Baja California, Mexico (Loomis 1965), which is apparently now extinct. This frog is predicted to occur within the survey area. The closest documented location is near what was then known as the town of Berryessa, somewhere along the middle reaches of Penitencia Creek (Jennings et al. 1999). However, this museum specimen was collected in 1904 and that population is now extinct due to extensive urbanization of the area. The next nearest location is in upper Penitencia Creek near the headquarters of Alum Rock Park. The population was presumed to be extant during the 1990s (Jennings et al. 1999).

RESULTS AND DISCUSSION

Results of the ocular surveys showed no CRLFs or FYLFs in the Berryessa Creek stream channel (see data sheets in Appendix 1). As predicted by earlier surveys conducted by the Santa Clara Valley Water District (M. Moore, pers. comm.), I found Pacific treefrogs (*Hyla regilla*) and California toads (*Bufo boreas halophilus*) to be common in several sections of the stream channel, especially in urbanized areas where residents water their lawns on a regular basis (which results in runoff into the nearby stream channel that daily rehydrates the pools of water used by these amphibians). The stream channel itself was poor habitat for CRLFs and FYLFs due to its intermittent nature (the stream supports no

fish species because it dries on a yearly basis), lack of deep (>2 feet) pools of water, and the presence of many raccoons throughout the area surveyed (see data sheet in Appendix 2).

Instead, a breeding population of CRLFs was discovered in 3 of 5 grouped ponds located in the middle part of the drainage near the easternmost San Jose City Boundary, about 1.25 miles upstream of the proposed project area boundary (Figure 2) [Appendix 3]. The ponds are located below a major spring on a hillside approximately 160 feet above the creek and 800 feet south of the creek proper. The ponds with CRLFs contain water year around, are deep (>4 feet), and have abundant riparian cover and food resources. Because of the distance from the Berryessa Creek proper and the intermittent nature of the creek itself (it apparently flows less than 7 months out of the year during normal rainfall years), no juvenile CRLFs are able to colonize the main creek channel. If they did, they would soon be swept away during flood flows or predated by raccoons, as there are no deep pools for frogs to escape in. Indeed, no CRLFs or FYLFs have been observed in Berryessa Creek below Old Piedmont Road despite the multiple amphibian surveys conducted since the year 2000 (M. Moore, Santa Clara Valley Water District, pers. comm.). Since CRLFs and FYLFs do not inhabit the main channel of Berryessa Creek and CRLFs are unable to colonize the stream course, the proposed project in upper Berryessa Creek will not have any adverse effects on these two species. The project site is located approximately 1.25 miles downstream from the region where CRLFs were observed in ponds on the hillside. Additionally, the project site is located in a densely urbanized area with many roads, fences, and foraging raccoons between the project site and the ponds with CRLFs. Given these observations, it is my professional opinion that the project, as proposed by the U.S. Army Corps of Engineers and the Santa Clara Valley Water District, will have no influence on potential CRLF movements or dispersals, and therefore have no apparent, negative effects on this species.

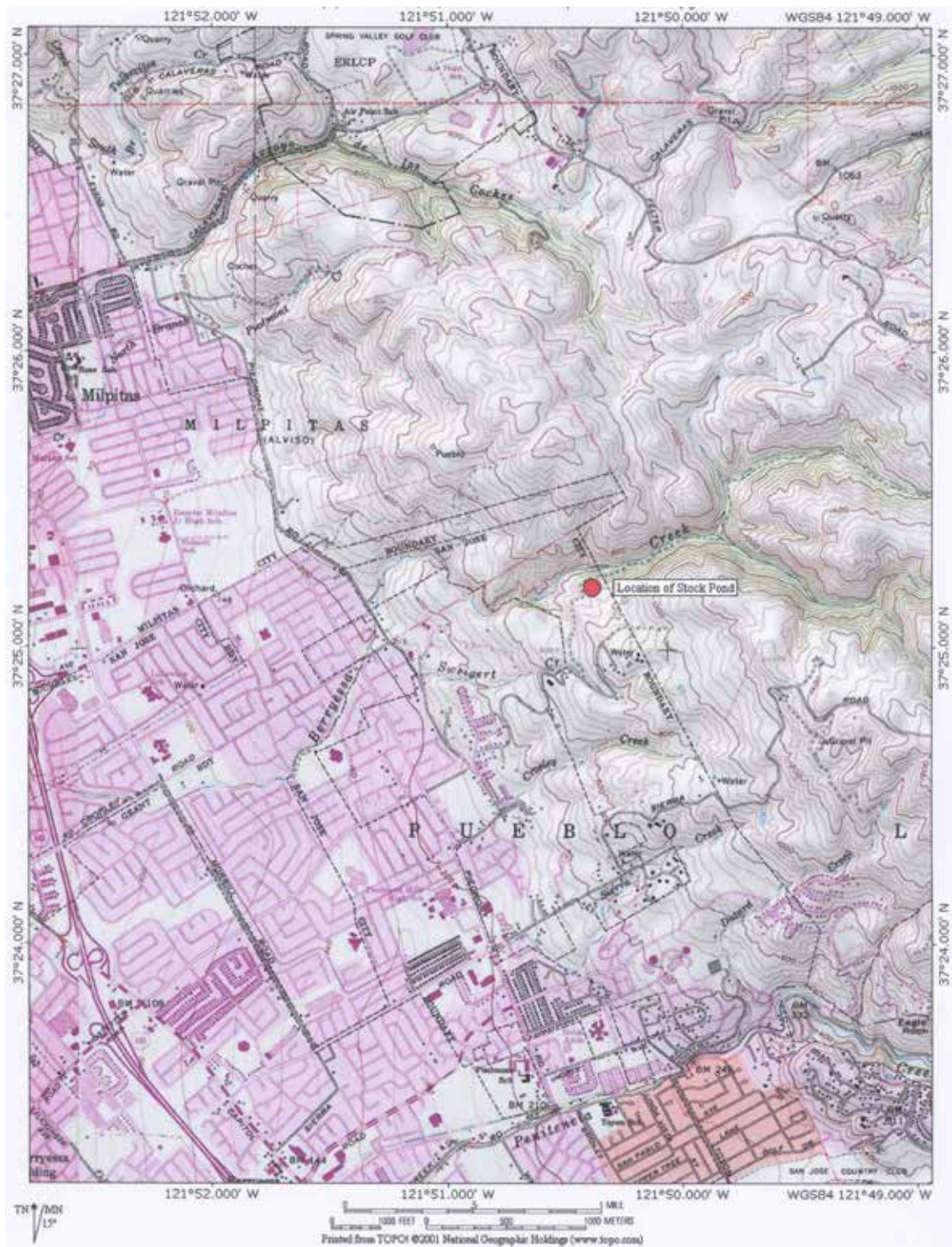


Figure 2. Location of the stock pond where California red-legged frogs were observed in the upper Berryessa Creek drainage.

ACKNOWLEDGMENTS

My thanks to Melissa Moore of the Santa Clara Valley Water District for assisting with some of the daylight ocular frog surveys and for previous survey information regarding amphibians in upper Berryessa Creek.

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APPENDICES

Appendix 1. California red-legged frog field survey forms for the Upper Berryessa Creek Project.

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____
(FWS Field Office) (date) (biologist)

Date of Survey: 03/16/2006 Survey Biologist: Jennings, Mark
(mm/dd/yyyy) (Last name) (first name)
Survey Biologist: _____
(Last name) (first name)

Site Location: Santa Clara Co., Upper Berryessa Creek from Morrill Ave. upstream to 750 feet elevation.
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

Type of Survey (circle one): DAY NIGHT BREEDING NON-BREEDING
Survey number (circle one): 1 2 3 4 5 6 7 8
Begin Time: 1:00 PM End Time: 6:00 PM
Cloud cover: Overcast Precipitation: Intermittent Light Rain
Air Temperature: 58°F Water Temperature: 50°F
Wind Speed: Low Visibility Conditions: Good
Moon phase: N/A Humidity: Heavy
Description of weather conditions: Light rain through much of the day off and on
Brand name and model of light used to conduct surveys: N/A
Were binoculars used for the surveys (circle one)? YES NO
Brand, model, and power of binoculars: Bushnell, Custom Compact, 7X26 CF

**Appendix E.
California Red-legged Frog Survey Data Sheet**

03/16/2006

AMPHIBIAN OBSERVATIONS

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|------------------|-------------|---------------------------|--------------------|-------------------------|-----------------------------|
| Pacific Treefrog | Dozens | O/H | Juveniles & Adults | All | 100% |
| California Toad | 2 | 0 | Juvenile | Post-larval (last year) | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons:

Many raccoon tracks
noted along the stream. No other predators observed.

Other notes, observations, comments, etc.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.
California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____

(FWS Field Office)

(date)

(biologist)

Date of Survey: 03/24/2006
(mm/dd/yyyy)

Survey Biologist: Jennings Mark
(Last name) (first name)

Survey Biologist: _____
(Last name) (first name)

Site Location: Santa Clara Co, Upper Berryessa Creek from Merrill Ave upstream to 750 feet
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S). elevation,

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

Type of Survey (circle one): DAY NIGHT BREEDING NON-BREEDING

Survey number (circle one): 1 2 3 4 5 6 7 8

Begin Time: 6:30 PM

End Time: 11:30 PM

Cloud cover: Overcast

Precipitation: Moderate Rainfall

Air Temperature: 48°F

Water Temperature: 50°F

Wind Speed: Low

Visibility Conditions: Impaired by rain

Moon phase: Can't Tell (Clouds)

Humidity: Heavy

Description of weather conditions: Moderate Rainfall -- perfect for hunting
amphibians. Heard only Pacific treefrog calling

Brand name and model of light used to conduct surveys: Koehler Wheat Lamp, 5000 Series,
4 Volts

Were binoculars used for the surveys (circle one)? YES NO

Brand, model, and power of binoculars: Bushnell, Custom Compact, 7X26 C.F

Appendix E.
California Red-legged Frog Survey Data Sheet

03/24/2006

AMPHIBIAN OBSERVATIONS

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|------------------|-------------|---------------------------|-------------------|------------------|-----------------------------|
| Pacific Treefrog | 100s | 0/H | All post-neotenic | Juveniles-Adults | 100% |
| California Toad | 5 | 0 | Juveniles | Juveniles | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: No fish, bullfrogs, or
crayfish seen. Many raccoon tracks observed. One
dead raccoon seen above the Old Piedmont Road crossing.

Other notes, observations, comments, etc.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____
 (FWS Field Office) (date) (biologist)

Date of Survey: 03/31/2006 Survey Biologist: Jennings Mark
 (mm/dd/yyyy) (Last name) (first name)
 Survey Biologist: _____
 (Last name) (first name)

Site Location: Santa Clara Co., Upper Berryessa Creek from Merrill Ave, upstream to 750 feet
 (County, General location name, UTM Coordinates or Lat./Long. or T-R-S). elevation.

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
 Brief description of proposed action:

Type of Survey (circle one): DAY NIGHT BREEDING NON-BREEDING
 Survey number (circle one): 1 2 3 4 5 6 7 8
 Begin Time: 7:00 PM End Time: 10:30 PM
 Cloud cover: Overcast Precipitation: Heavy Rain
 Air Temperature: 44°F Water Temperature: 48°F
 Wind Speed: Moderate Visibility Conditions: Poor (heavy rain)
 Moon phase: Can't Tell (cloudy) Humidity: Heavy
 Description of weather conditions: Heavy rainfall much of the evening,
Creek running in flood stage
 Brand name and model of light used to conduct surveys: Koehler Wheat-Lamp, 5000 Series,
4 Volts
 Were binoculars used for the surveys (circle one)? YES NO
 Brand, model, and power of binoculars: Bushnell, Custom Compact, 7 X 26 CF

03/31/2006

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|------------------|-------------|---------------------------|-------------|------------|-----------------------------|
| Pacific Treefrog | 6 | H | Adult males | Adults | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: Raccoon tracks and 4 raccoons seen.

Raining very hard; creek in flood stage.

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____
(FWS Field Office) (date) (biologist)

Date of Survey: 04/10/2006 Survey Biologist: Jennitas Mark
(mm/dd/yyyy) (Last name) (first name)
Survey Biologist: _____
(Last name) (first name)

Site Location: Santa Clara Co., Upper Berryessa Creek from Moorill Ave., upstream to 750 feet
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S). elevation.

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

Type of Survey (circle one): DAY NIGHT BREEDING NON-BREEDING

Survey number (circle one): 1 2 3 4 5 6 7 8

Begin Time: 8:45 PM End Time: 11:30 PM

Cloud cover: Partly Cloudy Precipitation: None

Air Temperature: 49°F Water Temperature: 48°F

Wind Speed: Light Visibility Conditions: Excellent

Moon phase: First Quarter Humidity: Moderate

Description of weather conditions: Clear and cool. Creek still
cloudy from recent rains.

Brand name and model of light used to conduct surveys: Kochler Wheat Lamp, 5000 Series,
4 volts

Were binoculars used for the surveys (circle one)? YES NO

Brand, model, and power of binoculars: Bushnell Custom Compact 7 X 26 CF

Appendix E.
California Red-legged Frog Survey Data Sheet

04/10/2006

AMPHIBIAN OBSERVATIONS

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|--------------------|-------------|---------------------------|-------------|------------|-----------------------------|
| No Amphibians seen | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: Raccoon Tracks observed.
No fish, crayfish, or bullfrogs seen.

Other notes, observations, comments, etc. Lots of trash in the
lower reaches of the creek. Stream is still
elevated and cloudy from recent rains

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.
California Red-legged Frog Survey Data Sheet**

| | | |
|--|--------------|-------------------|
| Survey results reviewed by _____ (FWS Field Office) | _____ (date) | _____ (biologist) |
|--|--------------|-------------------|

Date of Survey: 04/30/2006
(mm/dd/yyyy)

Survey Biologist: Jennings, Mark
(Last name) (first name)

Survey Biologist: _____
(Last name) (first name)

Site Location: Santa Clara Co., Upper Berryessa Creek from Merrill Ave., upstream to 750 feet elevation,
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

| |
|---|
| Proposed project name: <u>Upper Berryessa Creek Project</u> |
| Brief description of proposed action: |
| |
| |
| |

Type of Survey (circle one): DAY NIGHT BREEDING NON-BREEDING

Survey number (circle one): 1 2 3 4 5 6 7 8

Begin Time: 6:30 PM End Time: 10:45 PM

Cloud cover: Partly Cloudy Precipitation: None

Air Temperature: 48°F Water Temperature: 51°F

Wind Speed: Light Visibility Conditions: Excellent

Moon phase: Half Humidity: Moderate

Description of weather conditions: Fairly clear and cool, stream still cloudy from rains last week.

Brand name and model of light used to conduct surveys: Koehler Wheat Lamp, 5000 series, 4 Volts

Were binoculars used for the surveys (circle one)? YES NO

Brand, model, and power of binoculars: Bushnell Custom Compact, 7X 26 CF

Appendix E.
California Red-legged Frog Survey Data Sheet

04/30/2006

AMPHIBIAN OBSERVATIONS

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|-------------------|-------------|---------------------------|----------------------|--------------------|-----------------------------|
| Pacific Treefrogs | Dozens | O/H | All | Larvae - Adults | 100% |
| California Toads | Dozens | O | Larvae and Juveniles | Larvae - Juveniles | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: Lots of raccoon tracks,
No fish seen.

Other notes, observations, comments, etc. Stream still murky from recent rains.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by _____

(FWS Field Office)

(date)

(biologist)

Date of Survey: 05/17/2006
(mm/dd/yyyy)

Survey Biologist: Jennings
(Last name)

Mark
(first name)

Survey Biologist: Moore
(Last name)

Melissa
(first name)

Site Location: Santa Clara Co, Upper Berryessa Creek from Merrill Ave. upstream to 750 feet
(County, General location name, UTM Coordinates or Lat/Long. or T-R-S). elevation

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project

Brief description of proposed action:

Type of Survey (circle one) DAY NIGHT

BREEDING NON-BREEDING

Survey number (circle one): 1 2 3 4 5 6 7 8

Begin Time: 10:00 AM

End Time: 5:30 PM

Cloud cover: Partly Cloudy

Precipitation: None

Air Temperature: 95°F

Water Temperature: 65°F

Wind Speed: Light

Visibility Conditions: Excellent

Moon phase: N/A

Humidity: Moderate

Description of weather conditions: Fairly clear with a light breeze from time to time, otherwise very hot!

Brand name and model of light used to conduct surveys: N/A

Were binoculars used for the surveys (circle one)? YES NO

Brand, model, and power of binoculars: Bushnell Custom Compact, 7X26 CF

Appendix E.
California Red-legged Frog Survey Data Sheet

05/17/2006

AMPHIBIAN OBSERVATIONS

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|-------------------|-------------|------------------------|-------------|-----------------|-----------------------------|
| Pacific Treefrogs | Dozens | O/H | All | Larvae - Adults | 100% |
| California Toads | Dozens | O | All | Larvae - Adults | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons:

NO fish, bullfrogs, or
grayfish seen. Raccoon tracks observed.

Other notes, observations, comments, etc.

California red-legged frogs (5 adults and 1 subadult) observed in stock pond overlooking the creek. CNDDB Form filled out and Water District Officials notified.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.
California Red-legged Frog Survey Data Sheet**

Survey results reviewed by _____
(FWS Field Office) (date) (biologist)

Date of Survey: 07/20/2006 Survey Biologist: Jennings Mark
(mm/dd/yyyy) (Last name) (first name)
Survey Biologist: _____
(Last name) (first name)

Site Location: Santa Clara Co., Upper Berryessa Creek from Morritt Ave. upstream to 750 feet
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S). elevation

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
Brief description of proposed action:

Type of Survey (circle one): DAY NIGHT BREEDING NON-BREEDING
Survey number (circle one): 1 2 3 4 5 6 7 8
Begin Time: 7:45 PM End Time: 11:45 PM
Cloud cover: Partly Overcast Precipitation: None
Air Temperature: 88°F Water Temperature: 60°F
Wind Speed: Light Visibility Conditions: Excellent
Moon phase: First Quarter Humidity: Heavy
Description of weather conditions: Clear, humid, and hot.

Brand name and model of light used to conduct surveys: Kochler Wheat Lamp 5000 Series
4 Volts

Were binoculars used for the surveys (circle one)? YES NO
Brand, model, and power of binoculars: Bushnell Custom Compact 7X26CF

Appendix E.
California Red-legged Frog Survey Data Sheet

07/20/2006

AMPHIBIAN OBSERVATIONS

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|------------------|-------------|---------------------------|-------------|-----------------|-----------------------------|
| Pacific Treefrog | Dozens | O/H | All | Larva-Adult | 100% |
| California Toad | Dozens | O | All | Larva-Juveniles | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: No fish, bullfrogs, or crayfish observed. Many raccoon tracks present along the creek.

Other notes, observations, comments, etc.

Most treefrog and toad reproduction along the lower reaches of the creek (in urban areas) where overflow from daily lawn watering keeps the stream hydrated.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

**Appendix E.
California Red-legged Frog Survey Data Sheet**

| | | |
|--|--------|-------------|
| Survey results reviewed by _____ (FWS Field Office) | (date) | (biologist) |
|--|--------|-------------|

Date of Survey: 07/27/2006 Survey Biologist: Jennings Mark
(mm/dd/yyyy) (Last name) (first name)
 Survey Biologist: Moore, Melissa
(Last name) (first name)

Site Location: Santa Clara Co., Upper Berryessa Creek from Merrill Ave. upstream to 750 feet elevation
 (County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project
 Brief description of proposed action:

Type of Survey (circle one): DAY NIGHT BREEDING NON-BREEDING
 Survey number (circle one): 1 2 3 4 5 6 7 8
 Begin Time: 10:00 AM End Time: 6:20 PM
 Cloud cover: Partly Cloudy Precipitation: None
 Air Temperature: 98°F Water Temperature: 65°F
 Wind Speed: Light Visibility Conditions: Excellent
 Moon phase: N/A Humidity: Moderate
 Description of weather conditions: Clear and hot!

Brand name and model of light used to conduct surveys: N/A

Were binoculars used for the surveys (circle one)? YES NO
 Brand, model, and power of binoculars: Bushnell Custom Compact, 7X 26 CF

**Appendix E.
California Red-legged Frog Survey Data Sheet**

07/27/2006

AMPHIBIAN OBSERVATIONS

| Species | # of indiv. | Observed (O) Heard (H) | Life Stages | Size Class | Certainty of Identification |
|------------------|-------------|---------------------------|----------------------|--------------------|-----------------------------|
| Pacific Treefrog | Dozens | 0 | Ad | Larvae - Adults | 100% |
| California Toad | Dozens | 0 | Larvae and Juveniles | Larvae - Juveniles | 100% |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: No fish, crayfish, or
bullfrogs observed. Raccoon tracks seen.

Other notes, observations, comments, etc.

Check set of stock ponds on hillside. Found 5 spring-fed ponds, one of which was almost dry. California red-legged frogs and Pacific treefrogs found in the lower 3 ponds. They probably utilize all the stock ponds when water is present. Also observed an adult Santa Cruz gartersnake hunting for amphibians.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

Appendix 2. California red-legged frog habitat assessment form for the Upper Berryessa Creek Project.

**Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet**

| | | | |
|-----------------------------------|--|-----------------------|----------------------------|
| Site Assessment reviewed by _____ | | | |
| <small>(FWS Field Office)</small> | | <small>(date)</small> | <small>(biologist)</small> |

Date of Site Assessment: 03/16/2006
(mm/dd/yyyy)

Site Assessment Biologists: Jennings, Mark
(Last name) (first name) (Last name) (first name)

(Last name) (first name) (Last name) (first name)

Site Location: Santa Clara Co., Upper Berryessa Creek from Merrill Ave. upstream to 750 feet elevation,
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: Upper Berryessa Creek Project

Brief description of proposed action:
The U.S. Army Corps of Engineers proposes to rechannelize upper Berryessa Creek from Merrill Ave. upstream to about 500 feet above Old Piedmont Road. Riparian habitat improvement in Berryessa Creek Park is also proposed.

1) Is this site within the current or historic range of the CRF (circle one)? YES NO

2) Are there known records of CRF within 1.6 km (1 mi) of the site (circle one)? YES NO
 If yes, attach a list of all known CRF records with a map showing all locations.

GENERAL AQUATIC HABITAT CHARACTERIZATION
(if multiple ponds or streams are within the proposed action area, fill out one data sheet for each)

POND:

Size: _____ Maximum depth: _____

Vegetation: emergent, overhanging, dominant species: _____

Substrate: _____

Perennial or Ephemeral (circle one). If ephemeral, date it goes dry: _____

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

STREAM:

Bank full width: 20 feet
Depth at bank full: 4 feet
Stream gradient: ~5%

Are there pools (circle one)? ☒ YES ☐ NO

If yes,

Size of stream pools: Between 4-6 feet wide
Maximum depth of stream pools: 2 feet (but most pools are <1-foot deep)

Characterize non-pool habitat: run, riffle, glide, other: Most of the non-pool habitat is composed of riffles and pocket water. There is heavy gasketing of cobbles and gravel by fines.

Vegetation: emergent, overhanging, dominant species: Flows through an oak woodland channel with sycamores, some gray pine, willows, and lots of poison oak.

Substrate: High percentage of rocks and cobbles with a few sections of bedrock and boulders. Lots of clay and fines present.

Bank description: Starts out in urbanized zone with narrow cut channel. Further upstream the banks are more vertical in a steep sided canyon.

Perennial or Ephemeral (circle one). If ephemeral, date it goes dry: Normally by the end of June of each year.

Other aquatic habitat characteristics, species observations, drawings, or comments:

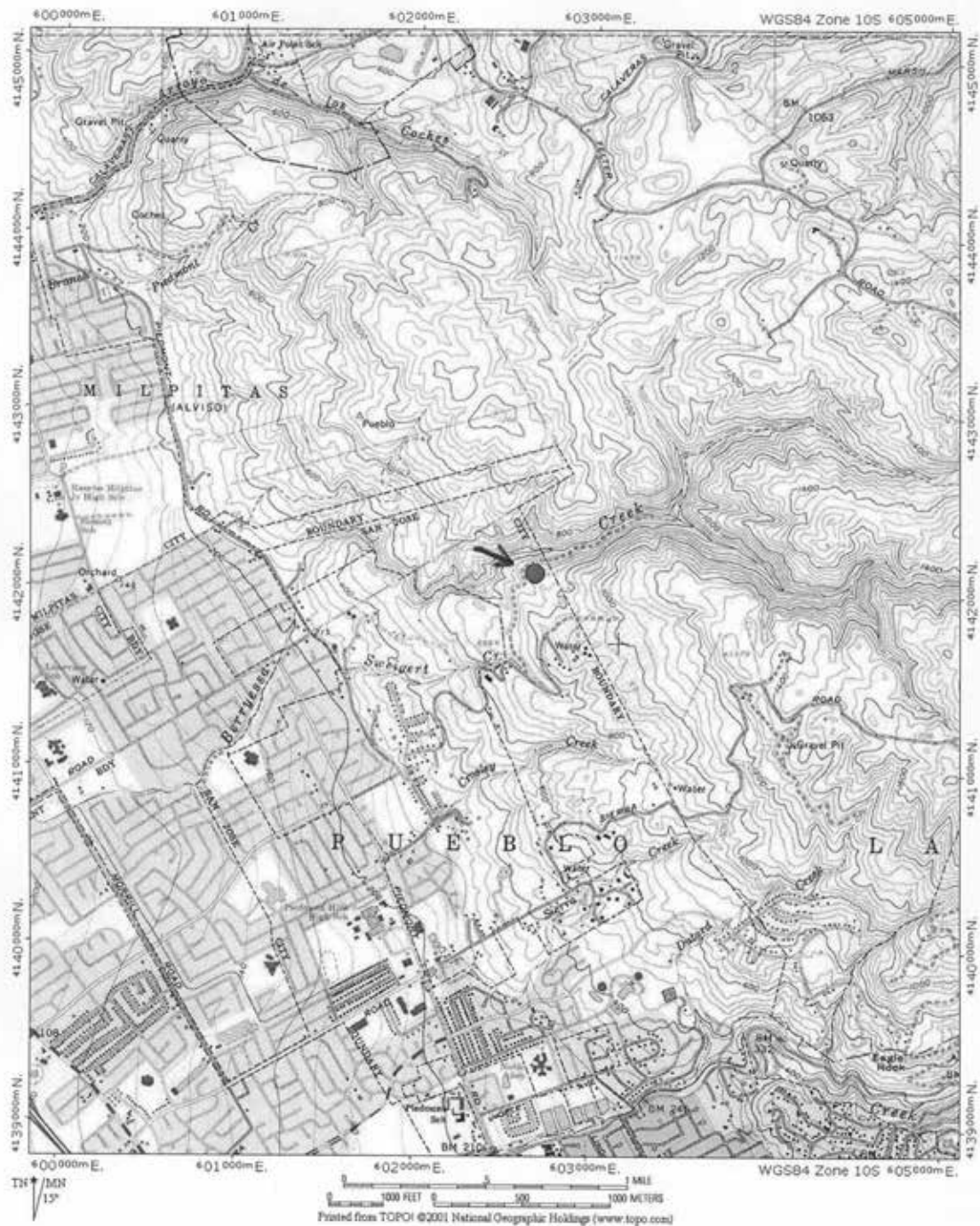
No fish, crayfish, or bullfrogs observed. Pacific treefrogs successfully breed throughout the drainage. Both Pacific treefrogs and California toads are commonly observed in the urbanized stream channel in Berryessa Creek Park. Main stream looks unsuitable for California red-legged frogs due to ephemeral nature, lack of deep pools, high amount of fines on the stream bottom, and the presence of raccoons (tracks seen).

Necessary Attachments:

1. All field notes and other supporting documents
2. Site photographs
3. Maps with important habitat features and species location

Appendix 3. Completed California Natural Diversity Data Base form.

| California Native Species Field Survey Form | |
|--|---|
| <p>Mail to: Natural Diversity Data Base California Dept. of Fish and Game 1416 Ninth Street, 12th Floor Sacramento, CA 95814</p> | <p>For office use only</p> <p>Source Code _____ Quad Code _____</p> <p>Elm Code _____ Occ # _____</p> <p>Copy to _____ Map Index # _____</p> |
| <p>Date of field work: <u>05 17 2006</u> mo day year</p> | |
| <p>Scientific Name (no codes): <u>Rana draytonii</u></p> | |
| <p>Species Found? <input checked="" type="checkbox"/> <input type="checkbox"/> yes no If not, why?</p> <p>Total # Individuals: <u>6</u> Subsequent visit? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no</p> <p>Compared to your last visit: <input type="checkbox"/> more <input type="checkbox"/> same <input type="checkbox"/> fewer</p> <p>Is this an existing NDDDB occurrence? <input type="checkbox"/> Yes, Occ. # <input checked="" type="checkbox"/> no unk.</p> <p>Collection? If yes _____ number Museum/Herbarium</p> | <p>Reporter: <u>Mark R. Jennings</u></p> <p>Address: <u>Rana Resources, P.O. Box 2185, Davis, CA 95617-2185</u></p> <p>Phone: <u>(530) 753-2727</u></p> <p>Other knowledgeable individuals (name/address/phone): <u>Melissa Moore, Santa Clara Valley Water District</u></p> |
| <p>Plant Information:</p> <p>Phenology: _____ %vegetative %flowering %fruiting</p> | <p>Animal Information:</p> <p>Age Structure: <u>5</u> <u>1</u> <u>0</u> # adults # juveniles # unknown</p> <p>Site Function: <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> breeding foraging wintering roosting burrow site other</p> |
| <p>Location: (Please also attach or draw map on back.) <u>Stockpond in the Upper Berryessa Creek drainage, just west of the City of San Jose City Boundary.</u></p> <p>County: <u>Santa Clara</u> Landowner/Mgr.: <u>Private</u></p> <p>Quad Name: <u>Calaveras Reservoir, CA (1780)</u> Elevation: <u>720 feet</u> UTM: <u>10S 602668m E</u> <u>4142113m N</u></p> <p>T <u>6S</u> R <u>1E</u> ^{"Lands of San Jose Mexican Land Grant"} 1/4 of _____ 1/4 Sec _____ T _____ R _____ 1/4 of _____ 1/4 Sec _____</p> | |
| <p>Habitat Description: (Plant communities, dominants, associates, substrate/soils, aspect/slope)</p> <p><u>Frogs found in a series of stock ponds created below a major spring. The lowest pond was examined and found to contain California red-legged frogs, Pacific treefrogs, and Santa Cruz gartersnakes. Pond was surrounded by grasses and sedges.</u></p> <p>Other rare spp.?</p> | |
| <p>Site Information: Current/surrounding land use: <u>Livestock grazing</u></p> <p>Visible disturbances, possible threats: <u>None</u></p> <p>Overall site quality: <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor Comments:</p> | |
| <p>Determination: (Check one or more, fill in the blanks)</p> <p>Keyed in a site reference: _____</p> <p>Compared with specimen housed at: _____</p> <p>Compared with photo/drawing in: _____</p> <p>By another person (name): _____</p> <p><input checked="" type="checkbox"/> Other: <u>Personal knowledge</u></p> | <p>Photographs: (Check one or more) Slide Print</p> <p>Plant/animal _____</p> <p>Habitat _____</p> <p>Diagnostic Feature _____</p> <p>Other _____</p> <p>May we obtain duplicates at our expense? <input type="checkbox"/> yes <input type="checkbox"/> no</p> |



Berryessa Creek Project

Santa Clara County

Appendix A: Environmental

Part III

Air Quality Emissions Data

Road Construction Emissions Model, Version 7.1.1

| Emission Estimates for -> Berryessa US | | | | | | | | | | | |
|--|---------------|--------------|---------------|----------------------|------------------------|------------------------------|-----------------------|-------------------------|-------------------------------|---------------|--|
| Project Phases (English Units) | ROG (lbs/day) | CO (lbs/day) | NOx (lbs/day) | Total PM10 (lbs/day) | Exhaust PM10 (lbs/day) | Fugitive Dust PM10 (lbs/day) | Total PM2.5 (lbs/day) | Exhaust PM2.5 (lbs/day) | Fugitive Dust PM2.5 (lbs/day) | CO2 (lbs/day) | |
| Grubbing/Land Clearing | 0.2 | 1.6 | 1.3 | 10.1 | 0.1 | 10.0 | 2.1 | 0.0 | 2.1 | 491.3 | |
| Grading/Excavation | 0.2 | 1.6 | 3.6 | 10.1 | 0.1 | 10.0 | 2.1 | 0.1 | 2.1 | 1,043.6 | |
| Drainage/Utilities/Sub-Grade | 0.2 | 1.5 | 1.2 | 10.1 | 0.1 | 10.0 | 2.1 | 0.0 | 2.1 | 488.7 | |
| Paving | 0.2 | 1.5 | 0.6 | 0.1 | 0.1 | - | 0.0 | 0.0 | - | 407.5 | |
| Maximum (pounds/day) | 0.2 | 1.6 | 3.6 | 10.1 | 0.1 | 10.0 | 2.1 | 0.1 | 2.1 | 1,043.6 | |
| Total (tons/construction project) | 0.0 | 0.3 | 0.4 | 1.7 | 0.0 | 1.7 | 0.4 | 0.0 | 0.4 | 147.0 | |
| Notes: Project Start Year -> 2017 | | | | | | | | | | | |
| Project Length (months) -> 18 | | | | | | | | | | | |
| Total Project Area (acres) -> 1 | | | | | | | | | | | |
| Maximum Area Disturbed/Day (acres) -> 1 | | | | | | | | | | | |
| Total Soil Imported/Exported (yd³/day)-> 160 | | | | | | | | | | | |
| PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified. | | | | | | | | | | | |
| Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L. | | | | | | | | | | | |

| Emission Estimates for -> Berryessa US | | | | | | | | | | | |
|--|---------------|--------------|---------------|----------------------|------------------------|------------------------------|-----------------------|-------------------------|-------------------------------|---------------|--|
| Project Phases (Metric Units) | ROG (kgs/day) | CO (kgs/day) | NOx (kgs/day) | Total PM10 (kgs/day) | Exhaust PM10 (kgs/day) | Fugitive Dust PM10 (kgs/day) | Total PM2.5 (kgs/day) | Exhaust PM2.5 (kgs/day) | Fugitive Dust PM2.5 (kgs/day) | CO2 (kgs/day) | |
| Grubbing/Land Clearing | 0.1 | 0.7 | 0.6 | 4.6 | 0.0 | 4.5 | 1.0 | 0.0 | 0.9 | 223.3 | |
| Grading/Excavation | 0.1 | 0.7 | 1.6 | 4.6 | 0.0 | 4.5 | 1.0 | 0.0 | 0.9 | 474.4 | |
| Drainage/Utilities/Sub-Grade | 0.1 | 0.7 | 0.5 | 4.6 | 0.0 | 4.5 | 1.0 | 0.0 | 0.9 | 222.2 | |
| Paving | 0.1 | 0.7 | 0.3 | 0.0 | 0.0 | - | 0.0 | 0.0 | - | 185.2 | |
| Maximum (kilograms/day) | 0.1 | 0.7 | 1.6 | 4.6 | 0.0 | 4.5 | 1.0 | 0.0 | 0.9 | 474.4 | |
| Total (megagrams/construction project) | 0.0 | 0.3 | 0.4 | 1.5 | 0.0 | 1.5 | 0.3 | 0.0 | 0.3 | 133.3 | |
| Notes: Project Start Year -> 2017 | | | | | | | | | | | |
| Project Length (months) -> 18 | | | | | | | | | | | |
| Total Project Area (hectares) -> 0 | | | | | | | | | | | |
| Maximum Area Disturbed/Day (hectares) -> 0 | | | | | | | | | | | |
| Total Soil Imported/Exported (meters³/day)-> 122 | | | | | | | | | | | |
| PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified. | | | | | | | | | | | |
| Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L. | | | | | | | | | | | |

Road Construction Emissions Model

Version 7.1.1

Data Entry Worksheet

Note: Required data input sections have a yellow background.

Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.

The user is required to enter information in cells C10 through C25.



Input Type

| | | |
|--|--------------|--|
| Project Name | Berryessa US | |
| Construction Start Year | 2017 | Enter a Year between 2009 and 2025 (inclusive) |
| Project Type | 1 | 1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction |
| Project Construction Time | 18.0 | months |
| Predominant Soil/Site Type: Enter 1, 2, or 3 | 1 | 1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock |
| Project Length | 2 | miles |
| Total Project Area | 1.0 | acre |
| Maximum Area Disturbed/Day | 1.0 | acres |
| Water Trucks Used? | 1 | 1. Yes 2. No |
| Soil Imported | 160.0 | yd ³ /day |
| Soil Exported | 0.0 | yd ³ /day |
| Average Truck Capacity | 20.0 | yd ³ (assume 20 if unknown) |

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

| Construction Periods | User Override of Construction Months | Program Calculated Months |
|------------------------------|---|---------------------------------|
| Grubbing/Land Clearing | | 1.80 |
| Grading/Excavation | | 7.20 |
| Drainage/Utilities/Sub-Grade | | 6.30 |
| Paving | | 2.70 |
| Totals | 0.00 | 18.00 |

| | | | | | |
|------|------|------|------|------|------|
| 2005 | % | 2006 | % | 2007 | % |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Hauling emission default values can be overridden in cells C45 through C46.

| Soil Hauling Emissions | | | | | | |
|------------------------------|---|-------|----------------|------|-------|---------|
| User Input | User Override of | | | | | |
| | Soil Hauling Defaults | | Default Values | | | |
| | Miles/round trip | 20.00 | 30 | | | |
| | Round trips/day | | 8 | | | |
| | Vehicle miles traveled/day (calculated) | | 160 | | | |
| Hauling Emissions | ROG | NOx | CO | PM10 | PM2.5 | CO2 |
| Emission rate (grams/mile) | 0.15 | 7.43 | 0.65 | 0.16 | 0.09 | 1652.56 |
| Emission rate (grams/trip) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pounds per day | 0.1 | 2.6 | 0.2 | 0.1 | 0.0 | 582.4 |
| Tons per construction period | 0.00 | 0.21 | 0.02 | 0.00 | 0.00 | 46.13 |

Worker commute default values can be overridden in cells C60 through C65.

| Worker Commute Emissions | | | | | | |
|--|-------------------------|-------|----------------|-------|-------|---------|
| | User Override of Worker | | | | | |
| | Commute Default Values | | Default Values | | | |
| | Miles/ one-way trip | | 20 | | | |
| | One-way trips/day | | 2 | | | |
| No. of employees: Grubbing/Land Clearing | | | 8 | | | |
| No. of employees: Grading/Excavation | | | 10 | | | |
| No. of employees: Drainage/Utilities/Sub-Grade | | | 10 | | | |
| No. of employees: Paving | | | 9 | | | |
| | ROG | NOx | CO | PM10 | PM2.5 | CO2 |
| Emission rate - Grubbing/Land Clearing (grams/mile) | 0.133 | 0.172 | 1.555 | 0.047 | 0.020 | 443.765 |
| Emission rate - Grading/Excavation (grams/mile) | 0.133 | 0.172 | 1.555 | 0.047 | 0.020 | 443.765 |
| Emission rate - Draining/Utilities/Sub-Grade (gr/mile) | 0.126 | 0.163 | 1.473 | 0.047 | 0.020 | 443.825 |
| Emission rate - Paving (grams/mile) | 0.120 | 0.154 | 1.399 | 0.047 | 0.020 | 443.880 |
| Emission rate - Grubbing/Land Clearing (grams/trip) | 0.457 | 0.287 | 3.779 | 0.004 | 0.003 | 95.644 |
| Emission rate - Grading/Excavation (grams/trip) | 0.457 | 0.287 | 3.779 | 0.004 | 0.003 | 95.644 |
| Emission rate - Draining/Utilities/Sub-Grade (gr/trip) | 0.435 | 0.270 | 3.586 | 0.004 | 0.003 | 95.679 |
| Emission rate - Paving (grams/trip) | 0.415 | 0.255 | 3.410 | 0.004 | 0.003 | 95.711 |
| Pounds per day - Grubbing/Land Clearing | 0.118 | 0.133 | 1.277 | 0.031 | 0.013 | 299.557 |
| Tons per const. Period - Grub/Land Clear | 0.002 | 0.003 | 0.025 | 0.001 | 0.000 | 5.931 |
| Pounds per day - Grading/Excavation | 0.118 | 0.133 | 1.277 | 0.031 | 0.013 | 299.557 |
| Tons per const. Period - Grading/Excavation | 0.009 | 0.011 | 0.101 | 0.002 | 0.001 | 23.725 |
| Pounds per day - Drainage/Utilities/Sub-Grade | 0.112 | 0.125 | 1.210 | 0.031 | 0.013 | 299.599 |
| Tons per const. Period - Drain/Util/Sub-Grade | 0.008 | 0.009 | 0.084 | 0.002 | 0.001 | 20.762 |
| Pounds per day - Paving | 0.120 | 0.119 | 1.150 | 0.031 | 0.013 | 348.523 |
| Tons per const. Period - Paving | 0.004 | 0.004 | 0.034 | 0.001 | 0.000 | 10.351 |
| tons per construction period | 0.023 | 0.025 | 0.244 | 0.006 | 0.003 | 60.769 |

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

| Water Truck Emissions | User Override of Default # Water Trucks | Program Estimate of Number of Water Trucks | User Override of Truck Miles Traveled/Day | Default Values Miles Traveled/Day | | |
|--|--|---|--|--------------------------------------|-------|---------|
| Grubbing/Land Clearing - Exhaust | | 1 | | 40 | | |
| Grading/Excavation - Exhaust | | 1 | | 40 | | |
| Drainage/Utilities/Subgrade | | 1 | | 40 | | |
| | ROG | NOx | CO | PM10 | PM2.5 | CO2 |
| Emission rate - Grubbing/Land Clearing (grams/mile) | 0.15 | 7.43 | 0.65 | 0.16 | 0.09 | 1652.56 |
| Emission rate - Grading/Excavation (grams/mile) | 0.15 | 7.43 | 0.65 | 0.16 | 0.09 | 1652.56 |
| Emission rate - Draining/Utilities/Sub-Grade (gr/mile) | 0.15 | 7.03 | 0.66 | 0.16 | 0.09 | 1637.92 |
| Pounds per day - Grubbing/Land Clearing | 0.01 | 0.65 | 0.06 | 0.01 | 0.01 | 145.60 |
| Tons per const. Period - Grub/Land Clear | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 11.53 |
| Pound per day - Grading/Excavation | 0.01 | 0.65 | 0.06 | 0.01 | 0.01 | 145.60 |
| Tons per const. Period - Grading/Excavation | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 11.53 |
| Pound per day - Drainage/Utilities/Subgrade | 0.01 | 0.62 | 0.06 | 0.01 | 0.01 | 144.31 |
| Tons per const. Period - Drainage/Utilities/Subgrade | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 10.00 |

Fugitive dust default values can be overridden in cells C110 through C112.

| Fugitive Dust | User Override of Max Acreage Disturbed/Day | Default Maximum Acreage/Day | PM10 pounds/day | PM10 tons/per period | PM2.5 pounds/day | PM2.5 tons/per period |
|---|---|--------------------------------|--------------------|-------------------------|---------------------|--------------------------|
| Fugitive Dust - Grubbing/Land Clearing | | 1 | 10.0 | 0.2 | 2.1 | 0.0 |
| Fugitive Dust - Grading/Excavation | | 1 | 10.0 | 0.8 | 2.1 | 0.2 |
| Fugitive Dust - Drainage/Utilities/Subgrade | | 1 | 10.0 | 0.7 | 2.1 | 0.1 |

| Off-Road Equipment Emissions | | | | | | | | | |
|--|------------------------|------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| Grubbing/Land Clearing | Default | | Type | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
| | Number of Vehicles | | | | | | | | |
| Override of Default Number of Vehicles | Program-estimate | | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | Excavators | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 2.14 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Graders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | Other Construction Equipment | 0.01 | 0.08 | 0.15 | 0.01 | 0.01 | 0.01 | 13.79 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rollers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Rubber Tired Dozers | 0.03 | 0.12 | 0.35 | 0.02 | 0.01 | 0.01 | 25.32 |
| | | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Scrapers | 0.00 | 0.02 | 0.05 | 0.00 | 0.00 | 0.00 | 4.94 |
| 0.00 | 4 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Grubbing/Land Clearing | pounds per day | 0.1 | 0.2 | 0.6 | 0.0 | 0.0 | 0.0 | 46.2 |
| | Grubbing/Land Clearing | tons per phase | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 |

| Grading/Excavation | Default | | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
|--------------------|--|------------------------------------|------|------|------|------|-------|------|
| | Number of Vehicles | | | | | | | |
| | Override of Default Number of Vehicles | Program-estimate | | | | | | |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | Cement and Mortar Mixers | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 1.22 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0 | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Excavators | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 2.14 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Graders | 0.01 | 0.02 | 0.05 | 0.00 | 0.00 | 3.61 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0 | Other Construction Equipment | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 1.38 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rollers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Rubber Tired Loaders | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 2.60 |
| | 1 | Scrapers | 0.00 | 0.02 | 0.05 | 0.00 | 0.00 | 4.94 |
| 0.00 | 4 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 |
| | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Grading/Excavation | pounds per day | 0.0 | 0.1 | 0.2 | 0.0 | 0.0 | 16.0 |
| | Grading | tons per phase | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 |

| Drainage/Utilities/Subgrade Override of Default Number of Vehicles | Default Number of Vehicles <i>Program-estimate</i> | | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
|---|--|------------------------------------|------------|------------|------------|------------|------------|------------|
| | | | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | Cement and Mortar Mixers | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 1.21 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Excavators | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Graders | 0.00 | 0.02 | 0.05 | 0.00 | 0.00 | 3.53 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.00 | | Other Construction Equipment | 0.03 | 0.15 | 0.27 | 0.01 | 0.01 | 27.03 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Plate Compactors | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 1.15 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rollers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Scrapers | 0.00 | 0.02 | 0.05 | 0.00 | 0.00 | 4.84 |
| 0.00 | 4 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Trenchers | 0.01 | 0.04 | 0.08 | 0.01 | 0.01 | 7.08 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Drainage | pounds per day | 0.0 | 0.2 | 0.5 | 0.0 | 0.0 | 44.8 |
| | Drainage | tons per phase | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.1 |

| Paving | Default | | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
|--|--|------------------------------------|------------|------------|------------|------------|------------|------------|
| | Number of Vehicles | | | | | | | |
| | Override of Default Number of Vehicles | Type | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Excavators | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Graders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.00 | | Other Construction Equipment | 0.02 | 0.15 | 0.24 | 0.01 | 0.01 | 26.51 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Pavers | 0.01 | 0.06 | 0.07 | 0.00 | 0.00 | 10.09 |
| | 1 | Paving Equipment | 0.01 | 0.13 | 0.13 | 0.01 | 0.01 | 21.34 |
| | | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Rollers | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 1.02 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Scrapers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 4 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Paving | pounds per day | 0.0 | 0.3 | 0.5 | 0.0 | 0.0 | 59.0 |
| | Paving | tons per phase | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 |
| Total Emissions all Phases (tons per construction period) => | | | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 7.0 |

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

| Equipment | | Default Values Horsepower | | Default Values Hours/day |
|------------------------------------|--|------------------------------|--|-----------------------------|
| Aerial Lifts | | 63 | | 8 |
| Air Compressors | | 106 | | 8 |
| Bore/Drill Rigs | | 206 | | 8 |
| Cement and Mortar Mixers | | 10 | | 8 |
| Concrete/Industrial Saws | | 64 | | 8 |
| Cranes | | 226 | | 8 |
| Crawler Tractors | | 208 | | 8 |
| Crushing/Proc. Equipment | | 142 | | 8 |
| Excavators | | 163 | | 8 |
| Forklifts | | 89 | | 8 |
| Generator Sets | | 66 | | 8 |
| Graders | | 175 | | 8 |
| Off-Highway Tractors | | 123 | | 8 |
| Off-Highway Trucks | | 400 | | 8 |
| Other Construction Equipment | | 172 | | 8 |
| Other General Industrial Equipment | | 88 | | 8 |
| Other Material Handling Equipment | | 167 | | 8 |
| Pavers | | 126 | | 8 |
| Paving Equipment | | 131 | | 8 |
| Plate Compactors | | 8 | | 8 |
| Pressure Washers | | 26 | | 8 |
| Pumps | | 53 | | 8 |
| Rollers | | 81 | | 8 |
| Rough Terrain Forklifts | | 100 | | 8 |
| Rubber Tired Dozers | | 255 | | 8 |
| Rubber Tired Loaders | | 200 | | 8 |
| Scrapers | | 362 | | 8 |
| Signal Boards | | 20 | | 8 |
| Skid Steer Loaders | | 65 | | 8 |
| Surfacing Equipment | | 254 | | 8 |
| Sweepers/Scrubbers | | 64 | | 8 |
| Tractors/Loaders/Backhoes | | 98 | | 8 |
| Trenchers | | 81 | | 8 |
| Welders | | 45 | | 8 |

Road Construction Emissions Model, Version 7.1.1

| Emission Estimates for -> Berryessa DS | | | | Total | Exhaust | Fugitive Dust | Total | Exhaust | Fugitive Dust | |
|--|---------------|--------------|---------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|---------------|
| Project Phases (English Units) | ROG (lbs/day) | CO (lbs/day) | NOx (lbs/day) | PM10 (lbs/day) | PM10 (lbs/day) | PM10 (lbs/day) | PM2.5 (lbs/day) | PM2.5 (lbs/day) | PM2.5 (lbs/day) | CO2 (lbs/day) |
| Grubbing/Land Clearing | 0.1 | 1.0 | 1.3 | 20.1 | 0.1 | 20.0 | 4.2 | 0.0 | 4.2 | 351.6 |
| Grading/Excavation | 1.0 | 4.8 | 45.7 | 21.0 | 1.0 | 20.0 | 4.7 | 0.6 | 4.2 | 10,291.8 |
| Drainage/Utilities/Sub-Grade | 0.1 | 0.9 | 1.1 | 20.1 | 0.1 | 20.0 | 4.2 | 0.0 | 4.2 | 347.5 |
| Paving | 0.1 | 1.0 | 0.5 | 0.0 | 0.0 | - | 0.0 | 0.0 | - | 218.8 |
| Maximum (pounds/day) | 1.0 | 4.8 | 45.7 | 21.0 | 1.0 | 20.0 | 4.7 | 0.6 | 4.2 | 10,291.8 |
| Total (tons/construction project) | 0.1 | 0.6 | 4.6 | 4.2 | 0.1 | 4.1 | 0.9 | 0.1 | 0.9 | 1,052.7 |
| Notes: Project Start Year -> 2017 | | | | | | | | | | |
| Project Length (months) -> 22 | | | | | | | | | | |
| Total Project Area (acres) -> 29 | | | | | | | | | | |
| Maximum Area Disturbed/Day (acres) -> 2 | | | | | | | | | | |
| Total Soil Imported/Exported (yd³/day)-> 2191 | | | | | | | | | | |
| PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified. | | | | | | | | | | |
| Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L. | | | | | | | | | | |

| Emission Estimates for -> Berryessa DS | | | | Total | Exhaust | Fugitive Dust | Total | Exhaust | Fugitive Dust | |
|--|---------------|--------------|---------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|---------------|
| Project Phases (Metric Units) | ROG (kgs/day) | CO (kgs/day) | NOx (kgs/day) | PM10 (kgs/day) | PM10 (kgs/day) | PM10 (kgs/day) | PM2.5 (kgs/day) | PM2.5 (kgs/day) | PM2.5 (kgs/day) | CO2 (kgs/day) |
| Grubbing/Land Clearing | 0.1 | 0.4 | 0.6 | 9.1 | 0.0 | 9.1 | 1.9 | 0.0 | 1.9 | 159.8 |
| Grading/Excavation | 0.4 | 2.2 | 20.8 | 9.5 | 0.4 | 9.1 | 2.1 | 0.3 | 1.9 | 4,678.1 |
| Drainage/Utilities/Sub-Grade | 0.1 | 0.4 | 0.5 | 9.1 | 0.0 | 9.1 | 1.9 | 0.0 | 1.9 | 158.0 |
| Paving | 0.0 | 0.4 | 0.2 | 0.0 | 0.0 | - | 0.0 | 0.0 | - | 99.4 |
| Maximum (kilograms/day) | 0.4 | 2.2 | 20.8 | 9.5 | 0.4 | 9.1 | 2.1 | 0.3 | 1.9 | 4,678.1 |
| Total (megagrams/construction project) | 0.1 | 0.5 | 4.2 | 3.8 | 0.1 | 3.7 | 0.8 | 0.1 | 0.8 | 954.8 |
| Notes: Project Start Year -> 2017 | | | | | | | | | | |
| Project Length (months) -> 22 | | | | | | | | | | |
| Total Project Area (hectares) -> 12 | | | | | | | | | | |
| Maximum Area Disturbed/Day (hectares) -> 1 | | | | | | | | | | |
| Total Soil Imported/Exported (meters³/day)-> 1675 | | | | | | | | | | |
| PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified. | | | | | | | | | | |
| Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L. | | | | | | | | | | |

Road Construction Emissions Model

Version 7.1.1

Data Entry Worksheet

Note: Required data input sections have a yellow background.

Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.

The user is required to enter information in cells C10 through C25.



Input Type

| | | |
|--|--------------|--|
| Project Name | Berryessa DS | |
| Construction Start Year | 2017 | Enter a Year between 2009 and 2025 (inclusive) |
| Project Type | 1 | 1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction |
| Project Construction Time | 22.0 | months |
| Predominant Soil/Site Type: Enter 1, 2, or 3 | 1 | 1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock |
| Project Length | 2.25 | miles |
| Total Project Area | 29.0 | acres |
| Maximum Area Disturbed/Day | 2.0 | acres |
| Water Trucks Used? | 1 | 1. Yes 2. No |
| Soil Imported | 1130.0 | yd ³ /day |
| Soil Exported | 1061.0 | yd ³ /day |
| Average Truck Capacity | 16.0 | yd ³ (assume 20 if unknown) |

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

| Construction Periods | User Override of Construction Months | Program Calculated Months |
|------------------------------|---|---------------------------------|
| Grubbing/Land Clearing | | 2.20 |
| Grading/Excavation | | 8.80 |
| Drainage/Utilities/Sub-Grade | | 7.70 |
| Paving | | 3.30 |
| Totals | 0.00 | 22.00 |

| | | | | | |
|------|------|------|------|------|------|
| 2005 | % | 2006 | % | 2007 | % |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Hauling emission default values can be overridden in cells C45 through C46.

| Soil Hauling Emissions | | | | | | | |
|------------------------------|---|-------|----------------|------|------|-------|---------|
| User Input | User Override of | | | | | | |
| | Soil Hauling Defaults | | Default Values | | | | |
| | Miles/round trip | 20.00 | 30 | | | | |
| | Round trips/day | | 137 | | | | |
| | Vehicle miles traveled/day (calculated) | | 2738.75 | | | | |
| Hauling Emissions | | ROG | NOx | CO | PM10 | PM2.5 | CO2 |
| Emission rate (grams/mile) | | 0.15 | 7.43 | 0.65 | 0.16 | 0.09 | 1652.56 |
| Emission rate (grams/trip) | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pounds per day | | 0.9 | 44.8 | 3.9 | 0.9 | 0.5 | 9969.0 |
| Tons per construction period | | 0.08 | 4.34 | 0.38 | 0.09 | 0.05 | 965.00 |

Worker commute default values can be overridden in cells C60 through C65.

| Worker Commute Emissions | | | User Override of Worker | | | |
|--|------------------------|----------------|-------------------------|-------|-------|---------|
| | Commute Default Values | Default Values | | | | |
| Miles/ one-way trip | | 20 | | | | |
| One-way trips/day | | 2 | | | | |
| No. of employees: Grubbing/Land Clearing | 4.00 | 8 | | | | |
| No. of employees: Grading/Excavation | 8.00 | 11 | | | | |
| No. of employees: Drainage/Utilities/Sub-Grade | 6.00 | 11 | | | | |
| No. of employees: Paving | 4.00 | 9 | | | | |
| | | | | | | |
| | ROG | NOx | CO | PM10 | PM2.5 | CO2 |
| Emission rate - Grubbing/Land Clearing (grams/mile) | 0.133 | 0.172 | 1.555 | 0.047 | 0.020 | 443.765 |
| Emission rate - Grading/Excavation (grams/mile) | 0.133 | 0.172 | 1.555 | 0.047 | 0.020 | 443.765 |
| Emission rate - Draining/Utilities/Sub-Grade (gr/mile) | 0.122 | 0.157 | 1.419 | 0.047 | 0.020 | 443.865 |
| Emission rate - Paving (grams/mile) | 0.120 | 0.154 | 1.399 | 0.047 | 0.020 | 443.880 |
| Emission rate - Grubbing/Land Clearing (grams/trip) | 0.457 | 0.287 | 3.779 | 0.004 | 0.003 | 95.644 |
| Emission rate - Grading/Excavation (grams/trip) | 0.457 | 0.287 | 3.779 | 0.004 | 0.003 | 95.644 |
| Emission rate - Draining/Utilities/Sub-Grade (gr/trip) | 0.420 | 0.259 | 3.458 | 0.004 | 0.003 | 95.703 |
| Emission rate - Paving (grams/trip) | 0.415 | 0.255 | 3.410 | 0.004 | 0.003 | 95.711 |
| Pounds per day - Grubbing/Land Clearing | 0.063 | 0.071 | 0.681 | 0.017 | 0.007 | 159.764 |
| Tons per const. Period - Grub/Land Clear | 0.002 | 0.002 | 0.016 | 0.000 | 0.000 | 3.866 |
| Pounds per day - Grading/Excavation | 0.063 | 0.071 | 0.681 | 0.017 | 0.007 | 159.764 |
| Tons per const. Period - Grading/Excavation | 0.006 | 0.007 | 0.066 | 0.002 | 0.001 | 15.465 |
| Pounds per day - Drainage/Utilities/Sub-Grade | 0.058 | 0.064 | 0.622 | 0.017 | 0.007 | 159.801 |
| Tons per const. Period - Drain/Util/Sub-Grade | 0.005 | 0.005 | 0.053 | 0.001 | 0.001 | 13.535 |
| Pounds per day - Paving | 0.057 | 0.063 | 0.613 | 0.017 | 0.007 | 159.807 |
| Tons per const. Period - Paving | 0.002 | 0.002 | 0.022 | 0.001 | 0.000 | 5.801 |
| tons per construction period | 0.015 | 0.016 | 0.157 | 0.004 | 0.002 | 38.668 |

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

| Water Truck Emissions | User Override of Default # Water Trucks | Program Estimate of Number of Water Trucks | User Override of Truck Miles Traveled/Day | Default Values Miles Traveled/Day | | |
|--|--|---|--|--------------------------------------|-------|---------|
| Grubbing/Land Clearing - Exhaust | | 1 | | 40 | | |
| Grading/Excavation - Exhaust | | 1 | | 40 | | |
| Drainage/Utilities/Subgrade | | 1 | | 40 | | |
| | ROG | NOx | CO | PM10 | PM2.5 | CO2 |
| Emission rate - Grubbing/Land Clearing (grams/mile) | 0.15 | 7.43 | 0.65 | 0.16 | 0.09 | 1652.56 |
| Emission rate - Grading/Excavation (grams/mile) | 0.15 | 7.43 | 0.65 | 0.16 | 0.09 | 1652.56 |
| Emission rate - Draining/Utilities/Sub-Grade (gr/mile) | 0.15 | 6.76 | 0.67 | 0.16 | 0.09 | 1628.24 |
| Pounds per day - Grubbing/Land Clearing | 0.01 | 0.65 | 0.06 | 0.01 | 0.01 | 145.60 |
| Tons per const. Period - Grub/Land Clear | 0.00 | 0.06 | 0.01 | 0.00 | 0.00 | 14.09 |
| Pound per day - Grading/Excavation | 0.01 | 0.65 | 0.06 | 0.01 | 0.01 | 145.60 |
| Tons per const. Period - Grading/Excavation | 0.00 | 0.06 | 0.01 | 0.00 | 0.00 | 14.09 |
| Pound per day - Drainage/Utilities/Subgrade | 0.01 | 0.60 | 0.06 | 0.01 | 0.01 | 143.46 |
| Tons per const. Period - Drainage/Utilities/Subgrade | 0.00 | 0.05 | 0.01 | 0.00 | 0.00 | 12.15 |

Fugitive dust default values can be overridden in cells C110 through C112.

| Fugitive Dust | User Override of Max Acreage Disturbed/Day | Default Maximum Acreage/Day | PM10 pounds/day | PM10 tons/per period | PM2.5 pounds/day | PM2.5 tons/per period |
|---|---|--------------------------------|--------------------|-------------------------|---------------------|--------------------------|
| Fugitive Dust - Grubbing/Land Clearing | | 2 | 20.0 | 0.5 | 4.2 | 0.1 |
| Fugitive Dust - Grading/Excavation | | 2 | 20.0 | 1.9 | 4.2 | 0.4 |
| Fugitive Dust - Drainage/Utilities/Subgrade | | 2 | 20.0 | 1.7 | 4.2 | 0.4 |

| Off-Road Equipment Emissions | | | | | | | |
|--|------------------------|------------------|------------------------------------|------------|------------|------------|------------|
| Grubbing/Land Clearing | | Default | | | | | |
| Override of Default Number of Vehicles | Number of Vehicles | Program-estimate | Type | ROG | CO | NOx | PM10 |
| | | | | pounds/day | pounds/day | pounds/day | pounds/day |
| | | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Cranes | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | | Excavators | 0.00 | 0.01 | 0.02 | 0.00 |
| | | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Graders | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | | Other Construction Equipment | 0.01 | 0.08 | 0.15 | 0.01 |
| | | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Pavers | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Rollers | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Rubber Tired Dozers | 0.03 | 0.12 | 0.35 | 0.02 |
| | | | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | | Scrapers | 0.00 | 0.02 | 0.05 | 0.00 |
| 0.00 | 5 | | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | Welders | 0.00 | 0.00 | 0.00 | 0.00 |
| | Grubbing/Land Clearing | pounds per day | | 0.1 | 0.2 | 0.6 | 0.0 |
| | Grubbing/Land Clearing | tons per phase | | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | 46.2 |
| | | | | | | | 1.1 |

| Grading/Excavation | Default | | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
|--|--------------------|------------------------------------|------------|------------|------------|------------|------------|------------|
| | Number of Vehicles | Type | | | | | | |
| Override of Default Number of Vehicles | Program-estimate | | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | Cement and Mortar Mixers | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 1.22 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0 | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Excavators | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 2.14 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Graders | 0.01 | 0.02 | 0.05 | 0.00 | 0.00 | 3.61 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0 | Other Construction Equipment | 0.00 | 0.02 | 0.03 | 0.00 | 0.00 | 2.76 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rollers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Rubber Tired Loaders | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 2.60 |
| | 1 | Scrapers | 0.00 | 0.02 | 0.05 | 0.00 | 0.00 | 4.94 |
| 0.00 | 5 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 |
| | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Grading/Excavation | pounds per day | 0.0 | 0.1 | 0.2 | 0.0 | 0.0 | 17.4 |
| | Grading | tons per phase | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 |

| Drainage/Utilities/Subgrade Override of Default Number of Vehicles | Default Number of Vehicles <i>Program-estimate</i> | | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
|---|--|------------------------------------|------------|------------|------------|------------|------------|------------|
| | | | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.00 | | Cement and Mortar Mixers | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 1.21 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Excavators | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Graders | 0.00 | 0.02 | 0.04 | 0.00 | 0.00 | 3.48 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.00 | | Other Construction Equipment | 0.02 | 0.15 | 0.25 | 0.01 | 0.01 | 26.65 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pavers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Paving Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Plate Compactors | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 1.14 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rollers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Scrapers | 0.00 | 0.02 | 0.04 | 0.00 | 0.00 | 4.77 |
| 0.00 | 5 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Trenchers | 0.01 | 0.04 | 0.08 | 0.01 | 0.01 | 6.98 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Drainage | pounds per day | 0.0 | 0.2 | 0.4 | 0.0 | 0.0 | 44.2 |
| | Drainage | tons per phase | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.7 |

| Paving | Default | | ROG | CO | NOx | PM10 | PM2.5 | CO2 |
|--|--|------------------------------------|------------|------------|------------|------------|------------|------------|
| | Number of Vehicles | | | | | | | |
| | Override of Default Number of Vehicles | Type | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day | pounds/day |
| | | Aerial Lifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Air Compressors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Bore/Drill Rigs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cement and Mortar Mixers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Concrete/Industrial Saws | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Cranes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crawler Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Crushing/Proc. Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Excavators | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Generator Sets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Graders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Tractors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Off-Highway Trucks | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.00 | | Other Construction Equipment | 0.02 | 0.15 | 0.24 | 0.01 | 0.01 | 26.51 |
| | | Other General Industrial Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Other Material Handling Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Pavers | 0.01 | 0.06 | 0.07 | 0.00 | 0.00 | 10.09 |
| | 1 | Paving Equipment | 0.01 | 0.13 | 0.13 | 0.01 | 0.01 | 21.34 |
| | | Plate Compactors | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pressure Washers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Pumps | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1 | Rollers | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 1.02 |
| | | Rough Terrain Forklifts | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Dozers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Rubber Tired Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Scrapers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 5 | Signal Boards | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Skid Steer Loaders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Surfacing Equipment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Sweepers/Scrubbers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Tractors/Loaders/Backhoes | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Trenchers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Welders | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Paving | pounds per day | 0.0 | 0.3 | 0.5 | 0.0 | 0.0 | 59.0 |
| | Paving | tons per phase | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 |
| Total Emissions all Phases (tons per construction period) => | | | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 8.7 |

Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

| Equipment | | Default Values Horsepower | | Default Values Hours/day |
|------------------------------------|--|------------------------------|--|-----------------------------|
| Aerial Lifts | | 63 | | 8 |
| Air Compressors | | 106 | | 8 |
| Bore/Drill Rigs | | 206 | | 8 |
| Cement and Mortar Mixers | | 10 | | 8 |
| Concrete/Industrial Saws | | 64 | | 8 |
| Cranes | | 226 | | 8 |
| Crawler Tractors | | 208 | | 8 |
| Crushing/Proc. Equipment | | 142 | | 8 |
| Excavators | | 163 | | 8 |
| Forklifts | | 89 | | 8 |
| Generator Sets | | 66 | | 8 |
| Graders | | 175 | | 8 |
| Off-Highway Tractors | | 123 | | 8 |
| Off-Highway Trucks | | 400 | | 8 |
| Other Construction Equipment | | 172 | | 8 |
| Other General Industrial Equipment | | 88 | | 8 |
| Other Material Handling Equipment | | 167 | | 8 |
| Pavers | | 126 | | 8 |
| Paving Equipment | | 131 | | 8 |
| Plate Compactors | | 8 | | 8 |
| Pressure Washers | | 26 | | 8 |
| Pumps | | 53 | | 8 |
| Rollers | | 81 | | 8 |
| Rough Terrain Forklifts | | 100 | | 8 |
| Rubber Tired Dozers | | 255 | | 8 |
| Rubber Tired Loaders | | 200 | | 8 |
| Scrapers | | 362 | | 8 |
| Signal Boards | | 20 | | 8 |
| Skid Steer Loaders | | 65 | | 8 |
| Surfacing Equipment | | 254 | | 8 |
| Sweepers/Scrubbers | | 64 | | 8 |
| Tractors/Loaders/Backhoes | | 98 | | 8 |
| Trenchers | | 81 | | 8 |
| Welders | | 45 | | 8 |

Berryessa Creek Project

Santa Clara County

Appendix A: Environmental

Part IV

404(b)(1) Water Quality Evaluation

**BERRYESSA CREEK
GENERAL REEVALUATION STUDY**

SECTION 404(b)(1) WATER QUALITY EVALUATION

SANTA CLARA COUNTY, CALIFORNIA

I. Project Description

a. Purpose and General Description

The U.S. Army Corps of Engineers (Corps) and the project sponsor, Santa Clara Valley Water District (SCVWD), have coordinated to initiate a General Reevaluation Study to determine the acceptability and feasibility of modifying a flood damage reduction project along Berryessa Creek. The proposed project would modify the channel downstream of the I-680 Bridge to consist of an earthen trapezoidal shape. Replacement of bridges and free-standing concrete floodwalls at a maximum height of 6feet would also be constructed.

The proposed project would result a reduction of flood risk to populated areas and a reduction of sedimentation and maintenance requirements. In addition, the project would use a cellular confinement system to control erosion and encourage revegetation of native grasses.

This analysis has been prepared in accordance with 40 CFR Part 230- Section 404(b)(1) guidelines and USACE Planning Guidance Notebook, ER 1 105-2- 100.

b. Location

The project area is located along Berryessa Creek between East Calaveras Blvd and Interstate 680, Milpitas, California. The project area extends approximately 2.25 miles.

c. Background

The proposed action is needed to reduce the risk of flood damages to the cities of Milpitas and San Jose. The Berryessa Creek Project was authorized by the Water Resources Development Act (WRDA) of 1990 following transmittal of the Chief of Engineer's Report in Coyote and Berryessa Creek in February 1989. After Congressional authorization in WRDA 1990, discussions with SCVWD, and interested environmental groups and community members showed that the project did not have wide support in the community. Issues included the damages to the riparian zone from a trapezoidal concrete channel, loss of aesthetics, recreation, and natural resources in the upstream project area. In 2001, SCVWD requested that the Corps reevaluate the flood protection alternatives along Berryessa Creek to find a more economical and environmentally acceptable solution.

d. Authority

The Berryessa Creek Project was initiated in partial response to Section 4 of the 1941 Flood Control Act, Public Law 77-228 and focused on flood and related problems and solutions along lower Coyote Creek and on Berryessa Creek. An Interim Feasibility Report for Coyote Creek and Berryessa Creek was transmitted to Congress and

authorized under Section 101(a)(5) of the Water Resources Development Act (WRDA) of 1990, Public Law 101-640.

e. Project Alternatives

It is not possible to avoid placing fill material into the waters of the United States (U.S.) and meet the project purpose. Under Alternatives 2a, 2B, and 4, material from the channel would be primarily excavated and removed but some reshaping and recontouring of the slopes would be necessary. Fill material needed to reshape the channel would be used from onsite material. Some sections of the side channel banks would require riprap slope projection. Alternative 5, proposes a trapezoidal concrete lined channel from Interstate 680 to Calaveras Blvd, where a rock transition would place transition flows from the concrete channel into the existing earth-bottomed channel.

f. General Description of Dredged or Fill Material

(1) General Characteristics of Material

Streambanks are formed of fairly erosion-resistant material; the soils contain a large clay component primarily consisting of silty and sandy clay. Upstream of I-680, soils retain a significant clay component but exhibit more frequent clayey silt and clayey sand lenses with occasional gravels. As a result, eroded sections of streambanks in this area are near vertical. Bed material is somewhat variable due to the high level of channel alteration and the presence of numerous bridges and several other hydraulic structures. In general, the bed material is composed of sands and gravels. The average distribution for the entire urbanized reach upstream of Calaveras Boulevard, is 28 percent sand, 69 percent gravel and 3 percent cobble with a median diameter of 5.5 mm (fine gravel). Completion of the actions would require excavation of native alluvial substrate and topsoil within some of the adjacent areas. The excavated material would be placed on-site and spread out to build up upland areas adjacent to the creek or removed from the site.

(2) Quantity of Material

Approximately 45 thousand cubic yards of material would be excavated and redistributed on-site.

(3) Source of Material

Fill would come from on-site material. Riprap would be trucked into the project site from a local quarry.

g. Description of the Proposed Discharge Site

(1) Location

The location of the discharge sites would be along Berryessa Creek between Calaveras Blvd and Interstate 680 (Exhibit C). provide a map that outlines the waters.

(2) *Size*

Total area of disturbance to waters of the United States are approximately 2.25 acres.

(3) *Type of Site*

The type of disposal site is a river channel.

(4) *Type of Habitat*

The project area into six reaches for the habitat surveys. The following habitat types were identified at and around the project area.

In Reach H-6, upstream of Old Piedmont Road, the riparian vegetation is diverse, including willows (*Salix* sp.), western sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), and blue elderberry (*Sambucus mexicana*). The herbaceous species included many non-natives such as pennyroyal (*Mentha pulegium*) and Canada thistle (*Cirsium arvense*). The lower end of this reach is dominated by eucalyptus, which may be a cause of the subsurface flow at the lower end of the reach, due to high rates of evapotranspiration.

In Reach H-5, the riparian zone ranges from mostly bare dirt to forest in the greenbelt. Dominant species in the greenbelt include blue elderberry, California black walnut (*Juglans californica*), English walnut (*Juglans regia*), Coast live oak (*Quercus agrifolia*), and willows. Mowed grass is present within and adjacent to the riparian zone.

In Reach H-4, the riparian zone is minimal to non-existent. The bank slopes are dominated by weedy annuals such as spiny sow thistle (*Sonchus asper*), dock (*Rumex* sp.), and perennial rye grass (*Lolium perenne*). This reach has the least vegetation present and the most channel alteration (concrete).

In Reach H-3, the riparian zone is very similar to Reach H-4, with weedy annuals such as rabbit foot grass (*Polypogon monspeliensis*) and barnyard grass (*Echinochloa crusgalli*). This reach has the highest banks (levees) and is entrenched in a narrow ditch.

In Reach H-2, the riparian zone is also very minimal, but the channel is much wider and more emergent wetland species are present. Species include cattails, floating primrose willow (*Ludwigia peploides*), hyssop loosestrife (*Lythrum hyssopifolia*), watercress (*Rorippa nasturtium aquaticum*), brooklime (*Veronica americanum*), and knotweed (*Polygonum* sp.). A few very sparse trees are also present.

In Reach H-1, the creek is tidal, and the vegetation is dominated by emergent wetland species such as bulrushes (*Scirpus acutus* and *S. maritimus*), cattails (*Typhsa angustifolia* and *T. latifolia*), and sedges (*Carex* sp). Willows and other riparian vegetation are present in a few locations, but the riparian zone is primarily dominated by weedy annual herbaceous species. Lower Penitencia Creek is still confined between steep-sided levees in much of this reach.

(5) *Timing and Duration of Discharge*

Construction of the project would be conducted in one phase and is estimated to take 60-90 days, with earthwork beginning in August and going to October. Revegetation would occur immediately after construction from October to December

h. Description of Disposal Method

A hydraulic excavator would be used to remove and stockpile material. Backfill would be performed with a front end loader. Riprap would be placed with a hydraulic excavator. Upland staging areas have been designated at each site for stockpiling of excavated and/or fill material.

II. Factual Determinations

a. Physical Substrate Determinations

(1) Comparison of Existing Substrate and Fill

The proposed fill material is from the same parent source as the existing material in the project area. No toxic or unnatural materials would be introduced at the sites, and substrates would retain their existing characteristics.

(2) Changes to Disposal Area Elevation

Substrate elevations will be modified from existing elevations throughout the project area. The current channel gradient varies dramatically from near 3 percent at the upstream end to below 0.5 percent at the downstream end. Though there is a strong trend for decreasing gradient in the downstream direction, there are localized areas where the gradient changes abruptly. This is partially due to the wide range of channel configurations currently found in the project area. At the current level of design, the proposed channel sections have been superimposed on the existing channel gradient. In the next level of design, the profile needs to be refined considering minimizing changes in sediment transport capacity that result from local variations in the gradient. Additionally, this exercise will likely have benefits to the providing the most efficient flood control design.

(3) Migration of Fill

The increased volume and velocity of flow is expected to flush silts and to increase the diversity of in-channel habitat structure. Geotextile fabric and cellular confinement system will be installed for bank stabilization.

(4) Duration and Extent of Substrate Change

Soil compaction could occur from heavy equipment operation. Most of the project area is located in areas that already experience sediment and soil compaction due to ongoing sediment removal and maintenance.

(5) *Changes to Environmental Quality and Value*

Native grasses and forbs would be established on banks to stabilize soils and prevent recolonization by invasive species.

(6) *Actions to Minimize Impacts*

Construction would have minor, short-term impacts. Standard erosion prevention practices would be employed. These measures would minimize erosion of soils and substrate during and after construction.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) *Alteration of Current Patterns and Water Circulation*

The project would not alter current flows.

(2) *Interference with Water Level Fluctuation*

Water levels in Berryessa Creek seasonally fluctuate from an intermitted flow in the winter and low to no flow in the summer. The project would not alter stream hydrology.

(3) *Salinity Gradients Alteration*

Salinity gradients would not be affected.

(4) *Effects on Water Quality*

(a) Water Chemistry

Disposal material would be excavated from on-site sources and would not contain foreign chemicals. The project would not change water chemistry.

(b) Salinity

The project would not change salinity levels.

(c) Clarity

Excavation and placement excavated material would be timed to occur in the dry or low water conditions.

(d) Color

Excavation and placement excavated material in the disposal area would material would be timed to occur in the-dry or low water conditions.

Construction activities would be short in duration and conditions would return to pre-construction levels.

(e) Odor

The project would not affect odor.

(f) Taste

The project would not affect taste.

(g) Dissolved Gas Levels

The proposed project would have no effect on dissolved gas levels.

(h) Temperature

The project would not change the temperature of the creek.

(i) Nutrients

The proposed project would not result in nutrient loading and reduction.

(j) Eutrophication

The project would not input excess nutrients into the stream or promote excessive plant growth. The project would not contribute to eutrophication.

(k) Other Characteristic

During construction

(5) *Changes to Environmental Quality and Value*

Flow patterns in the stream are greatly modified from natural patterns, due to various human disturbances. Sediment deposited would nearly equal to that under without-project conditions. The implementation of the project would not change the value and quality of the stream.

(6) *Actions to Minimize Impacts*

Construction and excavation would be timed with low water stages to minimal impacts. Best management practices (BMP) listed in section 5.4.3 of the environmental impact statement/ environmental (EIS/EIR) would avoid or reduce the potential for adverse impacts.

c. Suspended Particulate/Turbidity Determinations

(1) *Alteration of Suspended Particulate Type and Concentration*

Material excavated onsite would be used to beneficially to stabilize banks and create (aquatic, riparian) habitat. Excavation and placement excavated material would be timed to occur in the-dry or low water conditions. Particulates suspended during project construction would dissipate after construction activities are complete.

(2) *Particulate Plumes Associated with Discharge*

Temporary and local particulate plumes may occur during construction activities but would quickly dissipate after construction is complete.

(3) *Changes to Environmental Quality and Value*

Particulate plumes resulting from any construction activity are not expected to persist after project completion. Particulates suspended within the disposal area are not expected to differ in type from particulates currently within the project area.

(4) Actions to Minimize Impacts

Effects would be minimized by performing work during low flow periods in the dormant season. The duration of construction would be limited to the shortest timeframe practicable. As a result of mitigation measures, increases in sedimentation and turbidity would be minor and temporary.

d. Contaminant Determinations

A Phase I Environmental Site Assessment completed for the project revealed there are two historic releases below the surface of the project area. Plumes may contain the following substances: volatile organic compounds, PAHs and metals such as copper, cadmium, and mercury. At this time, the depth of construction has not been determined and it is not known if these plumes would interfere with construction. If construction is expected to be at least 6 feet deep in the vicinity of the plumes, then additional testing and precautionary measures would be implemented.

To minimize the potential for soil or water contamination from fuel or grease spills, maintenance and refueling of motorized equipment will be performed in upland areas at least 100 feet from waters of the U.S. and wetlands. BMP listed in section 5.4.3 of the EIS/EIR would avoid or reduce the potential for adverse impacts.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton

Plankton are drifting organisms that inhabit the pelagic zone of oceans, seas, or bodies of fresh water. The presence of plankton is generally low in high order streams. Construction of the project would be temporary, short termed, and timed during low flow conditions. There would be no effect to plankton as a result of the project.

(2) Effects on Benthos

Benthic organisms are found in the benthic zone which is the ecological region at the lowest level of a body of water such as an ocean or a lake, including the sediment surface and some sub-surface layers. Construction would be temporary, short termed and timed during low flow conditions. There would be no effect on benthos as a result of the project.

(3) Effects on Nekton

Nekton are of actively swimming aquatic organisms. Construction would be temporary, short termed, and timed during low flow conditions. There would be no effect to nekton as a result of the project.

(4) Effects on Aquatic Food Web

The project would have no effect on the aquatic food web.

(5) Effects on Special Aquatic Sites

(a) Sanctuaries and Refuges

No sanctuaries and refuges are within the project area.

(b) Wetlands

Wetlands are typically characterized by hydric soils. Hydric soils usually require hundreds of years for development. The stream channel alignment downstream of I-680 is artificial and was constructed in 1961. The presence of hydric soils was not verified. However, wetland vegetation was present in the project area. Vegetation primarily included cattails. Other wetland plant species included horsetail, watercress, and smartweed.

Construction activities would temporarily disturb or eliminate the vegetation. However, since the stream hydrology would not be permanently affected, the cattails would reestablish within one to three years after construction.

(c) Mud Flats

No mud flats are within the project area.

(d) Vegetated Shallows

No vegetated shallows are within the project area.

(e) Coral Reefs

No coral reefs are within the project area.

(f) Riffle and Pool Complexes

The downstream portion of Berryessa Creek has been highly altered to a trapezoidal channel and levees and is regularly maintained by removal of sediment and vegetation. The instream habitat diversity is extremely low and the riparian zone within this area provide little to no cover for the creek or wildlife habitat.

(6) Threatened and Endangered Species

Chapter 4 Section 5 of the EIS/EIR discusses Federal and State listed species in detail. No special status species are in or near the project area.

(7) Other Wildlife

The project could have short-term effects on resident mammals, birds, reptiles, and amphibians. Noise from construction equipment and increased human presence could temporarily displace some wildlife, and temporary alteration of the channel

would occur. However, these adverse effects would be minor and temporary. The project area would be reseeded with native grasses.

(8) Actions to Minimize Impacts

Adverse effects would be temporary, and minimized by mitigation measures to prevent erosion and turbidity increases. Excavation would be timed to avoid spawning, nesting, or migration seasons. Placement of material excavated for construction of project features was designed in the context for beneficial use and bank stabilization to directly benefit the aquatic ecosystem.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Size Determination

Not applicable.

(2) Determination of Compliance with Applicable Water Quality Standards

The fill material would not violate Environmental Protection Agency or State water quality standards or violate the primary drinking water standards of the Safe Drinking Water Act (42 USC 300 et seq.).

Project design, standard construction and erosion practices would preclude the introduction of substances into surrounding waters. Materials removed for disposal off-site would be disposed of in an appropriate landfill or other upland area.

(3) Potential Effects on Human Use Characteristics

a) Municipal and Private Water Supplies

The fill material would not violate Environmental Protection Agency or State water quality standards or violate the primary drinking water standards of the Safe Drinking Water Act (42 USC 300 et seq.).

Project design, standard construction and erosion practices would preclude the introduction of substances into surrounding waters. Materials removed for disposal off-site would be disposed of in an appropriate landfill or other upland area.

b) Recreation and Commercial Fisheries

The project area does not support recreational or commercial fishing. Two fish species, the mosquitofish (*Gambusia affinis*) and California roach (*Lavina symmetricus*) were collected during field investigations. The mosquitofish is a non-native freshwater species introduced throughout California for mosquito control. This fish is adapted for life in shallow, often stagnant water where predatory fish are absent and temperatures are too high for other species. The California roach is a native species widely distributed throughout central and northern California. This species is tolerant of high temperatures and low oxygen levels, which enables them

to survive in areas unsuitable for most other fish species. California roach thrive when found alone or in association with one or two other species. Neither the mosquitofish or California roach is State or Federally listed or has any special status (ESA, 2002). Based on the results of the ESA fisheries investigation, the only fish species likely to be found in the project area are the mosquitofish and California roach and only in the reach between Calaveras Boulevard and Piedmont Creek where there are constant flows.

c) Water-related recreation

There is no water-related recreation within the project area.

d) Aesthetics

The visual character of the creek in most areas would change permanently. The shape of the channel would change to a trapezoidal configuration with floodwalls in some sections. However, this change would not degrade the visual character because the channel would continue to be earthen. Grasses and other vegetation would be removed to construct the trapezoidal channel and floodwalls. The side channels would be planted with a seed mix to control erosion and appear as annual grassland habitat. All modification and replacement of bridges and culverts would be consistent with existing bridge designs in the area so there would be no change in the visual character of the modified or new structures.

e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.

There are no parks, National Monuments, Historical Monuments, Wilderness Areas, Research Sites, Wild and Scenic Rivers, Gold Medal Trout Waters, or similar designated preserves near the project area.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

Construction of the flood walls in the dry would be the environmentally preferred alternative. Without implementation of this proposed action, it is likely that this action would be constructed at a later time in the wet, which would result in adverse effects on the aquatic ecosystem. Construction of the project in the dry would avoid these adverse effects to water quality, and aquatic species.

h. Determination of Secondary Effects on the Aquatic Ecosystem

No adverse secondary effects are expected to occur.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

- (1) No significant adaptations of the guidelines were made relative to this evaluation.
- (2) No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States.
- (3) The discharges of fill materials will not cause or contribute to, after consideration of disposal site dilution and dispersion, violation of any applicable State water quality standards for waters. The discharge operations will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
- (4) The placement of fill materials in the project area(s) will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973.
- (5) The placement of fill materials will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.
- (6) Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems include cessation of disposal activities during extreme tidal velocities associated with spring tides.
- (7) On the basis of the guidelines the proposed disposal site for the discharge of dredged material is specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.

Berryessa Creek Project

Santa Clara County

Appendix A: Environmental

Part V

USFWS Draft Coordination Act Report



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846



In Reply Refer To:
81420-2011-CPA-0084

APR 23 2012

Alicia Kirchner
Chief, Planning Division
Corps of Engineers, Sacramento District
1325 J Street
Sacramento, California 95825-2922

Dear Ms. Kirchner:

The Corps of Engineers has requested coordination under the Fish and Wildlife Coordination Act (FWCA) for the Berryessa Creek Flood Control Project. The proposed flood control project is located on Berryessa Creek in Santa Clara County, California. The enclosed report constitutes the Fish and Wildlife Service's draft FWCA report for the proposed project.

By copy of this letter we are requesting the agencies below to review and provide any comments on the draft report by May 25, 2012. If you have any questions regarding this report, please contact Doug Weinrich at (916) 414-6563.

Sincerely,

Daniel Welsh
Assistant Field Supervisor

Enclosure

cc:

Jamie Lefevre, COE, Sacramento, CA
NOAA Fisheries, Sacramento, CA
Regional Manager, CDFG, Yountville, CA
Central Valley Flood Protection Board, Sacramento, CA

FISH AND WILDLIFE COORDINATION ACT REPORT
BERRYESSA CREEK FLOOD CONTROL PROJECT
April 2012

This is the Fish and Wildlife Service's (Service) draft Fish and Wildlife Coordination Act (FWCA) report on the effects of the proposed Berryessa Creek Flood Control Project on fish and wildlife resources along Berryessa Creek in Milpitas, California. This report has been prepared under authority of, and in accordance with, the provisions of the Fish and Wildlife Coordination Act (16 U.S.C. sec 661).

BACKGROUND

The Berryessa Creek watershed is located in Santa Clara County, California, south of San Francisco Bay. Berryessa Creek is a tributary to the Coyote Creek system, which flows into the southernmost end of San Francisco Bay. The creek flows west out of the Diablo Range and into the residential neighborhoods of San Jose and Milpitas, finally turning north through industrial portions of Milpitas before joining Lower Penitencia Creek.

The proposed work is located on Berryessa Creek between East Calaveras Blvd. and Hwy 680. The downstream end of the reach terminates at East Calaveras Blvd and extends upstream 2.25 miles.

Since the completion of the Draft Berryessa Creek Project General Design Memorandum (GDM) in December 1993, the proposed plan has not been supported by the local community primarily due to the concrete channel features that were recommended. Also, refinements in design, costs, and benefits resulted in costs that exceeded benefits, thereby precluding Federal involvement in the project. A project study plan was developed in July 1996 to identify a more locally acceptable plan and complete a GDM. However, all planning and engineering work ceased in October 1996 due to unresolved issues on the direction and funding of the study. Since flooding is still a significant problem along Berryessa Creek, the Santa Clara Valley Water District (SCVWD) requested that the Corps reevaluate flood protection alternatives to find a more environmentally acceptable solution.

The primary purpose of the ongoing reevaluation study is to assess the feasibility of modifying the project to: 1) reduce flood damages to populated areas, 2) reduce sedimentation and maintenance requirements, 3) provide access and recreation to the public, as feasible, 4) restore environmental values whenever possible through the study reach consistent with the flood damage reduction purpose of the project, and 5) avoid and minimize effects to riparian and aquatic habitat.

PROJECT DESCRIPTION

There are five alternatives being evaluated; however, Alternative 1 and Alternative 5 are not being pursued. Alternative 1 is the no action alternative and would not meet project objectives. Alternative 5 is the earlier authorized project which is not being pursued due to high costs and lack of community support. Alternative 2, Alternative 3, and Alternative 4 have similar project

footprints, but offer different levels of protection. Alternative 2 provides a 100-year flood protection whereas, Alternative 3 and Alternative 4 provide a **Federal Emergency Management Agency (FEMA)** certified level of protection i.e., the means to pass a 200-year flood event. The project features unique to each alternative are described below.

Alternative 1: No Action

The No Action Alternative is being carried forward and analyzed to provide a basis from which to assess the advantages and disadvantages of the other study alternatives. This alternative assumes the likely future conditions in the project area without implementation of any of the action alternatives. Under this alternative, the Authorized Project would not be completed, objectives for flood protection would not be met, and an unacceptable public health and safety hazard (flooding in the cities of Milpitas and San Jose) would continue to occur.

Alternative 2: Incised Trapezoidal Channel (Moderate Protection)

Alternative 2 involves modification and/or replacement of bridge and culvert crossings and modification of the channel reaches downstream of I-680. The leveed channel reaches would have a modified earthen trapezoidal shape with bottom width varying from 10 feet to 50 feet. The side slopes would have 2 horizontal (H) to 1 vertical (V) ratio and cellular bank protection. The earthen levees would vary from 0 to 4 feet high and are designed to contain the 0.01 overtopping probability event discharges.

Alternative 3: Incised Trapezoidal Channel (FEMA Protection)

Alternative 3 involves modifications and/or replacement of bridges and culvert crossings. The channel reaches would have a modified earthen trapezoidal shape with bottom width varying from 10 feet to 70 feet. Side slopes would have 2H: 1V ratio and cellular bank protection. The floodwalls would be constructed 2 to 5 feet high where necessary. The location of the access road would vary.

Alternative 4: Walled Trapezoidal Channel (FEMA Protection)

The bridge and culvert modifications for Alternative 4 are consistent with Alternative 3. Alternative 4 involves the construction of vertical concrete floodwalls ranging from 0 to 5 feet high. Two vegetated floodplain benches; a 32-foot-wide bench on the left bank, and a 10-foot-wide bench on the right bank would be constructed. The right-of way restrictions require adaptation of the typical channel cross section to accommodate an access road within the available right-of-way. In areas with limited right-of-way, the access road would need to be located on the inside of the floodwall in order to allow for additional conveyance area. Transition ramps would be needed in areas where the access road location changes.

Alternative 5: Authorized Project

The authorized project consists of a sediment basin constructed upstream of Old Piedmont Road, modifications of the existing sediment basin, earthen levees in the greenbelt, and a concrete trapezoidal channel downstream of I-680.

Channel widening in combination with levees/floodwalls are proposed to meet the required level of protection. The extent of armoring varies from section to section, depending on overall footprint. In narrow reaches, for example, the toe protection may be continuous. Depths and

sizes of armoring would be further refined in the design phase to maintain the integrity of the channel. The channel profile may require grade control structures at bridge or utility crossings to prevent downcutting of the channel. Further geomorphic and sediment transport analyses may determine whether there is a need for additional grade control.

The presence of several trees within 15 feet of the top of the existing levees would be addressed by either placement of an underground root barrier wall or, for trees expected to be severely damaged by the cutoff wall placement, removal may occur.

The access road surface would need to be graded and compacted to sustain flood flows, and a cross slope for drainage would be required. Access road location is generally described on the right bank; however, it may be located on left bank if deemed appropriate during the design phase. Several tributaries enter the channel from the right, and construction of additional bridge crossings for an access road may be avoidable with placement along the left bank. Final placement would consider findings from a full utility inventory in the area, and the final access road configuration may vary from reach to reach.

Project alternatives involve the complete replacement of all bridge and culvert crossings with the exception of the Ames Avenue and Yosemite Drive crossings, which would require shoring/stabilization of existing abutments and construction of transition structures, and the I-680 crossing, which would not be affected by the proposed project. Utility modifications are required under all scenarios.

Construction would occur from May to October over two or three construction seasons depending on funding. Mobilization would occur the first week of May and demobilization would last one week at the end of October. The construction schedule would be a 5 day work week with an 8-10 hour work day.

BIOLOGICAL RESOURCES

Berryessa Creek is a tributary to Penitencia Creek and part of the Coyote Creek system, which flows out of the Diablo Range, through the residential neighborhoods of San Jose and Milpitas, and into the southernmost end of San Francisco Bay.

Vegetation

Suitable habitat for wildlife in Berryessa Creek occurs outside project boundaries in Berryessa Park and the greenbelt, as well as upstream of Old Piedmont Road. Downstream of the greenbelt, the vegetation consists of patchy annual grasses separated by bare dirt. The SCVWD maintains the levees and the channel inside the project area. Practices include removal of vegetation and sediment from the bottom of the channel and the use of herbicides on the stream banks. Frequent spraying or mowing of creek bank vegetation prevents the establishment of riparian species. The vegetation in and around the project area include cattails, floating primrose, willow, hyssop loosestrife, watercress, brooklime, rabbit foot grass, barnyard grass, and knotweed. A few ornamental trees and one blue elderberry shrub are present within the project area, but are sporadic along industrial property boundaries along the levee access road.

Wildlife

The project area has poor to non-existent wildlife habitat due to channelization and vegetation removal. Field surveys conducted in the project area have documented some of the common species that inhabit the area. Bird species observed include: great egret, black-crowned night heron, western scrub jay and mourning dove. Amphibians found in the creek include Pacific treefrog and western toad. Mammals observed include ground squirrels and muskrat. As Berryessa Creek is located adjacent to highly urbanized areas, feral cats were also observed (SCVWD 2005).

Fish

Berryessa Creek upstream of Calaveras Boulevard is an intermittent stream with occasional flows in the winter, but middle reaches of the creek are dry throughout most of the year. The only portion of the creek with perennial flow and potentially suitable habitat for small, warmwater fish species is downstream of the confluence with Piedmont Creek. But even this reach has seasonally high water temperatures and low dissolved oxygen that would be lethal to anadromous fish and most other fish species during the summer months.

Just downstream of Calaveras Boulevard, two fish species were collected, the mosquitofish and California roach. The mosquitofish is a non-native freshwater species introduced throughout California for mosquito control. This fish is adapted for life in shallow, often stagnant water where predatory fish are absent and temperatures are too high for other species. The California roach is a native species widely distributed throughout central and northern California. This species is tolerant of high temperatures and low oxygen levels, which enables them to survive in areas unsuitable for most other fish species. California roach thrive when found alone or in association with one or two other species. Neither the mosquitofish or California roach is State or Federally listed or has any special status.

Potential steelhead use of Berryessa Creek is limited by several physical conditions. Continuous flows of suitable depth (at least 7 inches) for adult steelhead passage occurred for only an estimated 2 to 5 days during the 2-year flow monitoring study. Reaches with a normally dry creek bed, low flows, sheet flows over concrete channels, poor spawning substrate, and physical barriers to passage preclude steelhead migration into Berryessa Creek.

Based on the results of a fisheries investigation conducted by Environmental Science Associates, the only fish species likely to be found in the project area are the mosquitofish and California roach and only in the reach between Calaveras Boulevard and Piedmont Creek where there are constant flows (Rieger and Podlech 2002).

Endangered Species

Appendix A contains a list of federally listed species which may be found in Santa Clara County. There are several State and Federally listed species which could occur within or around the project area. The Corps will need to determine the possible effects of the proposed project on listed species and consult with the appropriate resource agency.

DISCUSSION

Service Mitigation Policy

The recommendations provided herein for the protection of fish and wildlife resources are in accordance with the Service's Mitigation Policy as published in the Federal Register (46:15; January 23, 1981).

The Mitigation Policy provides Service personnel with guidance in making recommendations to protect or conserve fish and wildlife resources. The policy helps ensure consistent and effective Service recommendations, while allowing agencies and developers to anticipate Service recommendations and plan early for mitigation needs. The intent of the policy is to ensure protection and conservation of the most important and valuable fish and wildlife resources, while allowing reasonable and balanced use of the Nation's natural resources.

Under the Mitigation Policy, resources are assigned to one of four distinct Resource Categories, each having a mitigation planning goal which is consistent with the fish and wildlife values involved. The Resource Categories cover a range of habitat values from those considered to be unique and irreplaceable to those believed to be much more common and of relatively lesser value to fish and wildlife. The Mitigation Policy does not apply to threatened and endangered species, Service recommendations for completed Federal projects or projects permitted or licensed prior to enactment of Service authorities, or Service recommendations related to the enhancement of fish and wildlife resources.

In applying the Mitigation Policy during an impact assessment, the Service first identifies each specific habitat or cover-type that may be impacted by the project. Evaluation species which utilize each habitat or cover-type are then selected for Resource Category analysis. Selection of evaluation species can be based on several rationale, as follows: (1) species known to be sensitive to specific land- and water-use actions; (2) species that play a key role in nutrient cycling or energy flow; (3) species that utilize a common environmental resource; or (4) species that are associated with Important Resource Problems, such as anadromous fish and migratory birds, as designated by the Director or Regional Directors of the Fish and Wildlife Service. (Note: Evaluation species used for Resource Category determinations may or may not be the same evaluation species used in a HEP application, if one is conducted). Based on the relative importance of each specific habitat to its selected evaluation species, and the habitat's relative abundance, the appropriate Resource Category and associated mitigation planning goal are determined.

Mitigation planning goals range from "no loss of existing habitat value" (i.e., Resource Category 1) to "minimize loss of habitat value" (i.e., Resource Category 4). The planning goal of Resource Category 2 is "no net loss of in-kind habitat value"; to achieve this goal, any unavoidable losses would need to be replaced in-kind. "In-kind replacement" means providing or managing substitute resources to replace the habitat value of the resources lost where such substitute resources are physically and biologically the same or closely approximate those lost.

In addition to mitigation planning goals based on habitat values, Region 8 of the Service, which includes California, has a mitigation planning goal of no net loss of acreage and value for wetland habitat. This goal is applied in all impact analyses.

In recommending mitigation for adverse impacts to fish and wildlife habitat, the Service uses the same sequential mitigation steps recommended in the Council on Environmental Quality's regulations. These mitigation steps (in order of preference) are: avoidance, minimization, rectification of measures, measures to reduce or eliminate impacts over time, and compensation.

Two fish and/or wildlife habitats were identified in the Berryessa Creek Flood Control Project areas which have the potential to be impacted by the project. These are emergent wetland and annual grassland. The resource categories, evaluation species, and mitigation planning goal for the habitats impacted by the project are summarized in Table 1.

Table 1. Resource categories, evaluation species, and mitigation planning goals for the habitats impacted by the Berryessa Creek Flood Control Project.

| COVER-TYPE | EVALUATION SPECIES | RESOURCE CATEGORY | MITIGATION GOAL |
|------------------|--------------------|-------------------|---|
| Emergent wetland | Great egret | 2 | No net loss of habitat while minimizing loss of in-kind value |
| Annual grassland | Red-tailed hawk | 4 | Minimize loss of habitat value |

The evaluation species selected for the emergent wetland cover-type that would be impacted is the great egret. This species was selected because of: (a) their key role as predators in the ecosystem, (b) the Service's responsibility for their protection and management under the Migratory Bird Treaty Act, and (c) their overall high non-consumptive value to humans (i.e., bird watching). In general, emergent wetland habitat is valuable for a multitude of wildlife species, which include birds, mammals, reptiles, and amphibians. In the project area this cover-type is only located in the floodplain of the creek. Due its relative scarcity, the Service designates the emergent wetland cover-type in the project area as Resource Category 2. Our associated mitigation planning goal for these areas is "no net loss of habitat value while minimizing loss of in-kind habitat value."

The evaluation species selected for the annual grassland cover-type is the red-tailed hawk, which utilizes these areas for foraging. This species was selected because of the Service's responsibility for their protection and management under the Migratory Bird Treaty Act, and their overall high non-consumptive values to humans. Annual grassland areas potentially impacted by the project vary in their value to the evaluation species, depending on the degree of human disturbance, plant species composition, and juxtaposition to other foraging and nesting areas. Overall, the annual grassland values in the project area are low. Therefore, the Service designates the annual grassland cover-type in the project area as Resource Category 4. Our associated mitigation planning goal for these areas is "minimize loss of habitat value."

Wildlife species inhabiting habitat around the construction area may be temporarily displaced during construction activities, but are expected to return when construction is completed.

Construction impacts to annual grassland on the levee and adjacent to the levee toe would be temporary and would be restored following construction activities by reseeding the impacted areas with native grasses.

Based on our initial review, the proposed project would result in the temporary loss of habitat acreage and value for species inhabiting emergent wetland and annual grassland habitat. Wildlife species utilizing these areas would be displaced during construction activities and would likely return to the area following the completion of the project.

The highly impacted nature of the creek provides little habitat or diversity for fish and wildlife species in its current state. Designs focused on alternatives which provide benefits to fish and wildlife through the creation of a more natural stream profile should be completed. The creation of vegetated floodplain benches is a step in this direction and could significantly improve the utility of the creek for fish and wildlife as well as provide an appropriate level of flood protection. Currently, Alternative 4 is the Service's preferred alternative as it would provide the multi-benefits of a high level of flood protection and improvements to the creek by creating the vegetated floodplain benches.

RECOMMENDATIONS

The Service recommends that the Corps:

- 1) Avoid impacts to any native trees, shrubs, and aquatic vegetation within and adjacent to the site to the extent possible.
- 2) Avoid future impacts at the site by ensuring any fill material used for construction is free of contaminants.
- 3) Avoid impacts to migratory birds nesting in trees along the access routes and adjacent to the proposed sites by conducting preconstruction surveys for active nests along proposed haul roads, staging areas, and construction sites. This would be especially important if construction begins in the spring. Work activity around active nests should be avoided until young have fledged.
- 4) Minimize impacts by reseeding all disturbed areas at the completion of construction with native forbs and grasses.
- 5) Minimize the impact of removal and/or trimming of any trees and shrubs by having these activities supervised and/or completed by a certified arborist.
- 6) Work with the Service and other resource agencies to quantify project affects and determine mitigation needs for the selected project alternative.
- 7) Contact NOAA Fisheries for possible effects of the project on federally listed species under their jurisdiction.

- 8) Contact the California Department of Fish and Game regarding possible effects of the project on State listed species.

LITERATURE CITED

Rieger, P. and Podlech, M. 2002. Berryessa Creek Levee Project Fisheries Investigations. Environmental Science Associates. 2002.

SCVWD. 2005. Summary of Biological Surveys Conducted by Santa Clara Valley Water District. Prepared by Melissa Moore, biologist.

Appendix A

**Federal Endangered and Threatened Species that may
occur in or may be affected by the project**

U.S. Fish & Wildlife Service**Sacramento Fish & Wildlife Office**

**Federal Endangered and Threatened Species that Occur in
or may be Affected by Projects in the Counties and/or
U.S.G.S. 7 1/2 Minute Quads you requested**

Document Number: 120419033637

Database Last Updated: September 18, 2011

No quad species lists requested.

County Lists**Santa Clara County****Listed Species****Invertebrates**

- Branchinecta conservatio
 - Conservancy fairy shrimp (E)
- Branchinecta lynchi
 - vernal pool fairy shrimp (T)
- Desmocerus californicus dimorphus
 - valley elderberry longhorn beetle (T)
- Euphydryas editha bayensis
 - bay checkerspot butterfly (T)
 - Critical habitat, bay checkerspot butterfly (X)
- Lepidurus packardii
 - Critical habitat, vernal pool tadpole shrimp (X)
 - vernal pool tadpole shrimp (E)

Fish

- Acipenser medirostris
 - green sturgeon (T) (NMFS)

- *Eucyclogobius newberryi*
 - tidewater goby (E)
- *Hypomesus transpacificus*
 - delta smelt (T)
- *Oncorhynchus kisutch*
 - coho salmon - central CA coast (E) (NMFS)
 - Critical habitat, coho salmon - central CA coast (X) (NMFS)
- *Oncorhynchus mykiss*
 - Central California Coastal steelhead (T) (NMFS)
 - Central Valley steelhead (T) (NMFS)
 - Critical habitat, Central California coastal steelhead (X) (NMFS)
 - South Central California steelhead (T) (NMFS)
- *Oncorhynchus tshawytscha*
 - Central Valley spring-run chinook salmon (T) (NMFS)
 - winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- *Ambystoma californiense*
 - California tiger salamander, central population (T)
 - Critical habitat, CA tiger salamander, central population (X)
- *Rana draytonii*
 - California red-legged frog (T)
 - Critical habitat, California red-legged frog (X)

Reptiles

- *Gambelia* (=Crotaphytus) *sila*
 - blunt-nosed leopard lizard (E)
- *Masticophis lateralis euryxanthus*
 - Alameda whipsnake [=striped racer] (T)
 - Critical habitat, Alameda whipsnake (X)
- *Thamnophis gigas*
 - giant garter snake (T)

- *Thamnophis sirtalis tetrataenia*
 - San Francisco garter snake (E)

Birds

- *Brachyramphus marmoratus*
 - Critical habitat, marbled murrelet (X)
 - marbled murrelet (T)
- *Charadrius alexandrinus nivosus*
 - western snowy plover (T)
- *Pelecanus occidentalis californicus*
 - California brown pelican (E)
- *Rallus longirostris obsoletus*
 - California clapper rail (E)
- *Sternula antillarum* (=Sterna, =albifrons) browni
 - California least tern (E)
- *Vireo bellii pusillus*
 - Least Bell's vireo (E)

Mammals

- *Reithrodontomys raviventris*
 - salt marsh harvest mouse (E)
- *Vulpes macrotis mutica*
 - San Joaquin kit fox (E)

Plants

- *Castilleja affinis* ssp. neglecta
 - Tiburon paintbrush (E)
- *Ceanothus ferrisae*
 - Coyote ceanothus (E)
- *Dudleya setchellii*
 - Santa Clara Valley dudleya (E)

- *Eriophyllum latilobum*
 - San Mateo woolly sunflower (E)
- *Holocarpha macradenia*
 - Critical habitat, Santa Cruz tarplant (X)
 - Santa Cruz tarplant (T)
- *Lasthenia conjugens*
 - Contra Costa goldfields (E)
 - Critical habitat, Contra Costa goldfields (X)
- *Streptanthus albidus* ssp. *albidus*
 - Metcalf Canyon jewelflower (E)
- *Suaeda californica*
 - California sea blite (E)

Proposed Species

Amphibians

- *Rana draytonii*
 - Critical habitat, California red-legged frog (PX)

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online [Inventory of Rare and Endangered Plants](#).

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.

See our [Protocol](#) and [Recovery Permits](#) pages.

For plant surveys, we recommend using the [Guidelines for Conducting and Reporting Botanical Inventories](#). The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal [consultation](#) with the Service.
- During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.
- Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our [Map Room](#) page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. [More info](#)

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be July 18, 2012.

Berryessa Creek Project

Santa Clara County

Appendix A: Environmental

Part VI

SHPO Correspondence

**OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION**

P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov



January 20, 2004

REPLY TO: COE030530B

Tanis J. Toland
Chief, Environmental Analysis Section
U.S. Army Corps of Engineers, Sacramento
1325 J Street
Sacramento, CA 95814-2922

Re: Berryessa Creek Flood Control Project near San Jose and Milpitas, Santa Clara County.

Dear Ms. Toland:

Thank you for your July 23, 2003 letter in response to my June 19, 2003 letter that continues our consultation on this undertaking. I had requested additional information about the Corps' Area of Potential Effects (APE) for this undertaking. Specifically, the APE in your May 28, 2003 submittal did not correspond well with the description of the APE in the body of the letter, nor with the depictions of the project in various enclosures to that submittal.

In response, you have provided a map with this submittal that includes potential detention basin sites in the revised APE. Your letter, however, states that the APE may undergo adjustment as alternatives are identified and refined. If all these proposed alternatives are within the boundaries of the APE delimited on enclosure 2 of this submittal, then I do not object to the Corps' APE for this undertaking. If the APE may be revised beyond these boundaries, I suggest you consider a stipulation that deals with adjustments in the APE in the programmatic agreement you have proposed.

You have proposed using a phased identification and evaluation process for this undertaking, and have asked me to review a draft Programmatic Agreement (PA) that would implement such a phased approach. I concur that a phased approach is appropriate given the complexity of the undertaking and the urbanized setting. In order to facilitate my review, please provide me an electronic version of the draft PA to hkreu@ohp.parks.ca.gov.

I look forward to concluding this consultation as quickly as possible. If you have any questions about my comments, please contact staff archaeologist Anmarie Medin at (916) 653-8920 or at amedia@ohp.parks.ca.gov.

Sincerely,

Dr. Knox Mellon
State Historic Preservation Officer



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

Environmental Resources Branch

JUL 23 2003

Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Dr. Mellon:

In response to your letter dated June 19, 2003, the U.S. Army Corps of Engineers, Sacramento District, is writing to clarify the area of potential effects (APE) for the proposed Berryessa Creek (BC) flood control project near the cities of San Jose and Milpitas in Santa Clara County. We have been in consultation with Mr. Mike McGuirt regarding this project, and your file number for the project is COE030530B.

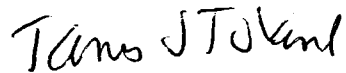
The regional map, which includes parts of the cities of San Jose and Milpitas, is included to show the general locations of the creeks and roadways only (enclosure 1). The APE for the BC project is where Berryessa Creek flows west out of the Diablo Range and the creek meanders through residential neighborhoods in San Jose and Milpitas. The APE is approximately 4.5 miles long, beginning approximately 600 feet upstream of Old Piedmont Road and extending downstream to Calaveras Boulevard and Highway 237 (enclosure 2). The APE is located on the Milpitas and Calaveras Reservoir, California, 7.5-minute U.S.G.S. topographic maps in T. 6S, R. 1E in a non-sectioned area of Milpitas and San Jose. After consultation with team members, we have refined the APE shown in enclosure 2 and have included the potential detention basin sites within the APE on the map.

In accordance with 36 CFR 800.4(2), we are using a phased identification and evaluation process for the BC project. The proposed project is in the preliminary stage, and the APE may undergo adjustment as alternatives are identified and refined. We are requesting that you comment on the APE pursuant to 36 CFR 800.4(a)(1) during this preliminary stage of the proposed project. In addition, we are re-submitting the draft Programmatic Agreement and project background, and requesting your consultation and participation (enclosures 3 and 4).

Comments on the APE may be sent to Ms. Melissa Montag (CESPK-PD-R), U.S. Army Corps of Engineers, Sacramento District, 1325 J Street, Sacramento, California 95814-2922. If you have any further questions about the APE or the descriptions of the APE, please contact

either Ms. Montag, Historian/Social Scientist, at (916) 557-7907 or email: melissa.l.montag@usace.army.mil, or Mr. Richard Perry, Archeologist, at (916) 557-5218 or email: richard.m.perry@usace.army.mil to arrange a meeting to discuss the proposed project in more detail.

Sincerely,

A handwritten signature in black ink that reads "Tanis J. Toland". The signature is written in a cursive, slightly slanted style.

Tanis J. Toland
Chief, Environmental Analysis Section

Enclosures

**OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION**

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19 June 2003

In Reply Refer To
COE030530B

Tanis J. Toland
Chief, Environmental Analysis Section
Sacramento District
U. S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

RE: ENVIRONMENTAL RESOURCES BRANCH [SECTION 106 CONSULTATION ON THE
BERRYESSA CREEK FLOOD CONTROL PROJECT, CITIES OF MILPITAS AND SAN JOSE,
SANTA CLARA COUNTY]

Dear Ms. Toland,

This letter is a response to your request that I comment on the area of potential effects (APE) for the subject undertaking. My comments here are made pursuant to 36 CFR Part 800, the regulations that implement Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f), as amended.

The depiction of the APE in Enclosure 4 of the U.S. Army Corps of Engineers' (Corps) letter of 28 May 2003 does not correspond well with the description of the APE in the body of that letter, nor with the depictions of the Project Limits in Enclosure 1 and the Potential Detention Basin Sites in Enclosure 5 of the letter. There is a large area to the north of Calaveras Boulevard and State Route 237 that the APE encompasses in Enclosure 4 that does not appear to correspond to either the Project Limits as depicted in Enclosure 1 of the letter or the Potential Detention Basin Sites in Enclosure 5. The APE in Enclosure 4 also does not appear to encompass the two most southerly of the Potential Detention Basin Sites in Enclosure 5.

Please provide me with additional or amended documentation that addresses the foregoing comments. I look forward to concluding the APE consultation after I have had an opportunity to review the additional information requested.

Please direct any questions or concerns that you may have to Project Review Unit archaeologist Mike McGuirt at 916.653.8920 or at mmcguirt@ohp.parks.ca.gov.

Sincerely,

Dr. Knox Mellon
State Historic Preservation Officer



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

Environmental Resources Branch

Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

MAY 28 2003

Dear Dr. Mellon:

The U.S. Army Corps of Engineers, Sacramento District, is writing pursuant to 36 CFR 800.3(c)(3) and 800.4(a)(1) to inform you of the proposed Berryessa Creek (BC) flood control project near the cities of San Jose and Milpitas, Santa Clara County (enclosure 1). We are requesting that you comment on the area of potential effects (APE), pursuant to 36 CFR 800.4(a)(1). Compliance for this proposed project is being conducted in accordance with Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR 800. In addition, we are commencing consultation with the Advisory Council on Historic Preservation (ACHP), inviting them to participate. We are developing a Programmatic Agreement (PA) and have enclosed a copy of the draft PA with project background information to you and the ACHP, requesting consultation and participation (enclosures 2 and 3).

The purpose of the proposed BC project is to reduce flood damages to areas of San Jose and Milpitas, reduce sedimentation and maintenance requirements, and provide aquatic and riparian habitat restoration and fish passage. The draft Berryessa Creek Project General Design Memorandum was completed in December 1993, but the proposed plan met with disfavor in the local community. The proposed project is now being reevaluated, and additional planning and development of alternatives is in progress.

The APE for the BC project is the Berryessa Creek watershed. This watershed encompasses about 22 square miles. The proposed project is located where Berryessa Creek flows west out of the Diablo Range into residential neighborhoods in San Jose and Milpitas. The APE is approximately 4.5 miles long, beginning approximately 600 feet upstream of Old Piedmont Road and extending downstream to Calaveras Boulevard and Highway 237 (enclosure 4). In accordance with 36 CFR 800.4(2), the proposed project is in the preliminary stage, and the APE may undergo adjustment as alternatives are considered and identified. An additional GIS map displays the potential detention basin sites within the APE (enclosure 5). The local sponsor for the project is the Santa Clara Valley Water District.

We have completed a records and literature search at the Northwest Information Center at Sonoma State University, Sonoma. We will also check the National Register of Historic Places and the California Historic Bridge Inventory, conduct a field survey, and consult with Native Americans.

Correspondence may be sent to:

Ms. Melissa Montag (CESPK-PD-R)
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

If you have any questions or comments, please contact either Ms. Melissa Montag, Social Scientist, at (916) 557-7907 or email: melissa.l.montag@usace.army.mil, or Mr. Richard Perry, Archeologist, at (916) 557-5218 or email: richard.m.perry@usace.army.mil. Please contact Mr. Mitch Hayden, Project Manager, at (916) 557-5304 with any specific project questions.

Sincerely,

Tanis J. Toland

Tanis J. Toland
Chief, Environmental Analysis Section

Enclosures



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

Environmental Resources Branch

AUG 09 2011

Mr. Milford Wayne Donaldson
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, California 95816-7100

Dear Mr. Donaldson:

This letter is regarding the Berryessa Creek Project in Santa Clara County, California. Your file number for the project is COE03050B. In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulation 36 CFR 800, we are requesting your agreement with our revised area of potential effect (APE) for the project and confirmation with our determination that archeology site CA-SCL-593 is eligible to the National Register of Historic Places (NRHP). This letter provides information on both previous and ongoing cultural efforts on the project.

Authorized Project and Previous APE. We are preparing the General Reevaluation Report (GRR) and draft Environmental Impact Statement (EIS) to address recommended modifications that have been proposed since the original project was authorized in 1992. The ongoing GRR assesses the feasibility of modifying the authorized project to control sedimentation and flooding in the Berryessa Creek project area through a combination of measures, including modification and replacement of bridges and culverts, channel modifications, floodwall and levee construction, and ecosystem restoration.

Your predecessor, Dr. Knox Mellon, agreed with our previous determination of the APE in a letter dated January 20, 2004 (enclosure 1). Dr. Mellon's letter was in response to our letter dated July 23, 2003, which stated: "The proposed project is in the preliminary stages, and the APE may undergo adjustment as alternatives are identified and refined" (enclosure 2). At that time, we were considering an alternative that has since been dropped from further consideration. As a result, we are reevaluating the alternatives and adjusting the APE accordingly.

Modified Project and APE. Five alternatives are currently being evaluated in the GRR, and they are explained in the enclosed project description (enclosure 3). The revised APE that corresponds with these alternatives extends approximately 4.5 miles along Berryessa Creek, beginning downstream where Berryessa Creek meets Calaveras Boulevard (Highway 237) and terminating directly south of Montague Expressway adjacent to I-680. The modified APE falls within the cities of Milpitas and San Jose in Santa Clara County, California, and is mapped in unsectioned Milpitas (1980) and Calaveras Reservoir (1980) USGS topographic quadrangles in Township 6 South, Range 1 East. The modified APE is shown on the

enclosed map (enclosure 4). We are also enclosing a copy of the original APE map for reference and comparison with the modified APE (enclosure 5).

Original Records Search and Draft PA. Our records and literature search in 2003 identified an archeology site with human remains within the original APE adjacent to Berryessa Creek. The site was found in 1986 when remains eroded out of the creek bank. The remains were removed by local Santa Clara County archeologist Dr. Robert Cartier. Dr. Cartier and Mr. Richard Stradford, Archeologist, San Francisco District, filed an archeology site record form, and the site was assigned CA-SCL-593 for the site trinomial. Dr. Cartier and Mr. Stradford drew an estimated site boundary, but did not conduct any further excavation beyond the removal of the remains that eroded from the creek bank.

In our July 23, 2003, letter we stated that we were planning to take a phased approach for compliance with Section 106, and we resubmitted a programmatic agreement (PA) for review. Mr. Hans Kreutzerg, formerly of your staff, requested an electronic version of the draft PA, which was sent by email in July 2003. No comments on the draft PA were ever received. However, in 2004, older Berryessa Creek project files were located that contained the following correspondence with your office.

Eligibility Determination and Draft MOA. We wrote to your office on December 9, 1993, with a request for concurrence with our determination of NRHP eligibility for CA-SCL-593 and a request for your review of a draft Memorandum of Agreement (MOA). Your office replied in a letter dated January 7, 1994, rejecting the eligibility determination and citing insufficient information to support the determination (enclosure 6). After discussions between Mr. Nicholas del Cioppo of your office and Ms. Patti Johnson, Corps Archaeologist assigned to the project at that time, Mr. del Cioppo reversed his earlier decision and concurred with NRHP eligibility under 36 CFR 60.4(d) in a letter dated March 30, 1994 (enclosure 7). The letter also referred to an MOA to address effects to CA-SCL-593. Due to the presence of a NRHP-eligible archeology site in the APE, we have determined that instead of executing the PA, and following approval of the recommended plan, we will rewrite and submit the previously drafted MOA that was started in 1993.

Updated Records Search and Surveys. After a lengthy period of reassessment of the project, we contracted with Basin Research Associates, Inc. (Basin), in 2009 to conduct an updated archeology survey of the earlier approved APE. The results of that survey are included in the enclosed report (enclosure 8). Basin obtained an updated records search from the Northwest Information Center at California State University, Sonoma, as well as a variety of other historical sources (enclosure 8, page 20). There were no new records identified in the APE since the last record search conducted in 2003 by Corps historian Ms. Melissa Montag.

An updated description of CA-SCL-593 is included in the Basin report (enclosure 8, pages 34-38). Basin also mentioned a concentration of nearby cultural materials that were first observed in 1987. In 1987, the concentration was assigned the field number C-167. The site was described as a midden deposit that could be part of CA-SCL-593. No deposits were noted during Basin's 2009 survey (enclosure 8, page 37). When writing the survey report, Basin was unaware of the exchange of letters with your office and the determination of eligibility for CA-SCL-593 in 1993 and 1994. They did a search of the Archeological Determinations of Eligibility list for Santa Clara County, and there was no mention of CA-SLC-593 in the County record. However, after revisiting the site in 2010, Basin confirmed that CA-SCL-593 appears eligible for listing in the NRHP under criterion d, thereby reaffirming the 1994 determination of eligibility (enclosure 8, page 36).

Native Americans and Human Remains. As part of our responsibility under Section 106, we obtained a list of potentially interested Native Americans from the Native American Heritage Commission (NAHC), and wrote letters to those parties to inform them of the proposed project and to inquire if they had knowledge of any sacred sites or traditional cultural properties in the APE. The outgoing letters were dated June 28, 2011.

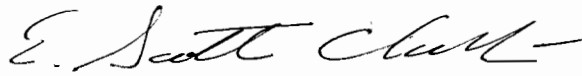
After substantial flows in Berryessa Creek from this past year's storms, human remains were noted about 1 meter deep in the east creek bank at CA-SCL-593. Since the Corps does not yet have an authorized project; responsibility for dealing with the remains was with the local sponsor and landowner, the Santa Clara Valley Water District (SCVWD). Following required State Health Resources procedures, the SCVWD contacted the Santa Clara Valley Sheriff's Department. The County Coroner visited the site and concluded that the remains were probably prehistoric Native American in origin. The SCVWD employee Mr. Ray Field contacted Ms. Rosemary Cambra, Chairwoman of the Muwekma Ohlone Tribe, and Mr. Alan Leventhal, Tribal Archeologist and Ethno-historian, to visit the location of the eroding burials. In an email to Corps archeologist Mr. Richard Perry, Mr. Leventhal said that the NAHC has not yet indentified the Most Likely Descendant for the remains (enclosure 9).

Future Work. After finalization of the GRR and EIS, the Sacramento District will turn the project over to the San Francisco District, who will be responsible for project design and construction. The San Francisco District will continue consultation pursuant to Section 106 and execute an MOA for data recovery of CA-SLC-593.

We request your agreement with our identification of the revised APE and our confirmation of the NRHP eligibility of archeology site CA-SCL-593. In addition, please review the enclosed archeology survey report and provide comments, if any. If you have any questions regarding cultural issues, please contact Mr. Richard M. Perry, Archeologist, at (916) 557-5218

or e-mail at: richard.m.perry@usace.army.mil. If you have any general project questions, please contact Mr. Cameron Sessions, Project Manager, at (916) 557-7896.or email at: cameron.l.sessions @usace.army.mil.

Sincerely,

A handwritten signature in black ink, appearing to read "E. Scott Clark", with a long horizontal flourish extending to the right.

Alicia E. Kirchner
Chief, Planning Division

Enclosures

**OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION**

1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov



January 25, 2012

Reply to: COE030530B

Alicia E. Kirchner
Army Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

RE: Berryessa Creek Project, Santa Clara County, California

Dear Ms. Kirchner:

Thank you for requesting my comments on the above cited undertaking. You are preparing the General Reevaluation Report and draft Environmental Impact Statement and have requested my comments in accordance with Section 106 of the National Historic Preservation Act as amended. My staff has reviewed the documentation you provided and I would like to offer the following comments.

You have requested to continue consultation for this undertaking and have asked my concurrence that your cultural resources identification efforts for the revised area of potential effects are sufficient. Finally, you have requested re-confirmation that CA-SCL-593 is eligible for the National Register of Historic Places. As documentation for your findings, you provided a report entitled, *Historic Property Survey Report and Finding of Effect Berryessa Creek Project Cities of San Jose and Milpitas, Santa Clara County, California*, dated December 2010. Based on the results of this report, I concur with your determination that the efforts to identify historic properties are sufficient for the purposes it was intended. In addition, as the State Historic Preservation Officer, I reaffirm the conclusion of this Office that CA-SCL-593 meets the criteria for eligibility for the National Register of Historic Places. I look forward to continuing consultation with the Corps as this project goes forward.

If my staff can be of any further assistance, please contact Dwight Dutschke at 916-445-7010.

Sincerely,

A handwritten signature in cursive script that reads "Susan H. Stratton for".

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer



FILE

January 13, 2009

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

Mr. Larry Meyers
Executive Secretary
Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, CA 95814

RE: Request for Review of Sacred Lands Inventory
Berryessa Creek Project, Cities of Milpitas and San Jose, Santa Clara County

Dear Mr. Meyers,

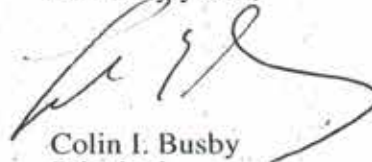
Please let this letter stand as our request for the Native American Heritage Commission (NAHC) to conduct a review of the NAHC *Sacred Lands Inventory* to determine if any listed properties are present within or adjacent to the above proposed project area (see enclosed USGS map).

The proposed project consists of various proposed flood channel improvements along an approximately four mile alignment of Berryessa Creek from Calaveras Boulevard on the north in the City of Milpitas, trending west to Old Piedmont Road in northeast City of San Jose.

Information from the NAHC *Sacred Lands Inventory* will be used in a Historic Property Survey Report/Finding of Effect (HPSR/FOE) to be submitted to the U.S. Army Corps of Engineers, Sacramento District.

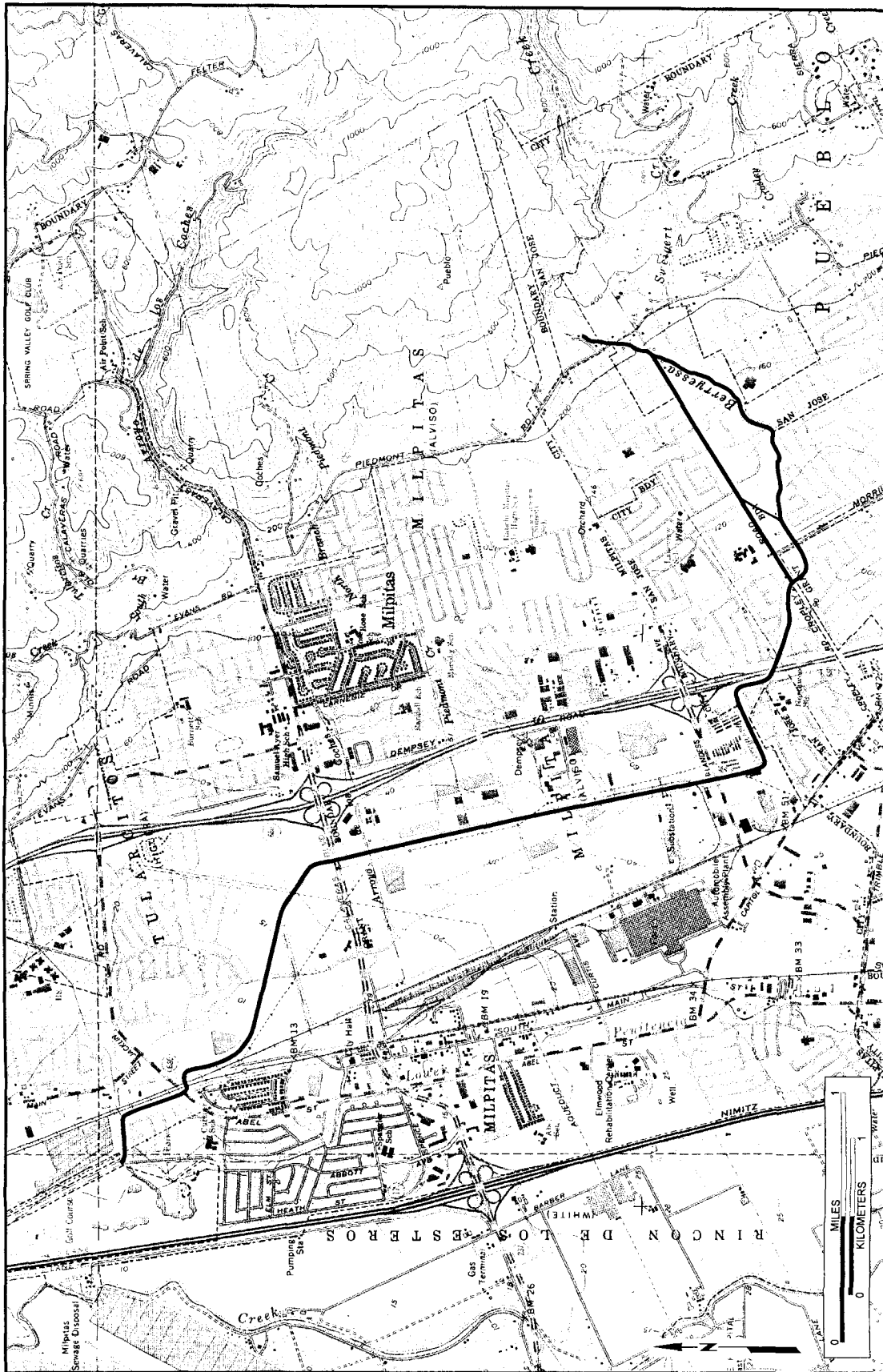
If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres@Gmail.com). Thank you for your timely review of our request.

Sincerely yours,



Colin I. Busby
Principal

CIB/m
Enclosures - Location Map



Project Location T6S R1E (USGS Milpitas, Calif. 1980 and Calaveras Reservoir, Calif. 1980)

STATE OF CALIFORNIAArnold Schwarzenegger, Governor**NATIVE AMERICAN HERITAGE COMMISSION**

915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
Fax (916) 657-5390
Web Site www.nahc.ca.gov



January 27, 2009

Colln I. Busby, Principal
BASIN RESEARCH ASSOCIATES
1933 Davis Street, Suite 210
San Leandro, CA 94577

Sent by Fax: 510-430-8443
Number of Pages: 3

Re: Proposed Berryessa Creek project, Santa Clara County.

Dear Mr. Busby:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,


Debbie Pilas-Treadway
Environmental Specialist III

**HISTORIC PROPERTY SURVEY REPORT
AND FINDING OF EFFECT**

**BERRYESSA CREEK PROJECT
CITIES OF SAN JOSE AND MILPITAS
SANTA CLARA COUNTY, CALIFORNIA**

PREPARED FOR THE

**U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT**

1325 J Street
Sacramento, CA 95814-2922

ATTN: Richard Perry

**CONTRACT NO.: W912PL-07-D-0048
Task Order No.: CM08**

BY

BASIN RESEARCH ASSOCIATES, INC.
1933 Davis Street, Suite 210
San Leandro, California 94577
(510) 430-8441

DECEMBER 2010

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CORRESPONDENCE

| | |
|--------|--|
| LETTER | REQUEST TO NATIVE AMERICAN HERITAGE COMMISSION |
| LETTER | NATIVE AMERICAN HERITAGE COMMISSION RESPONSE |

CHRIS/NWIC SEARCH RESULTS

| | |
|--------|--|
| SEARCH | File No. 08-0825 dated February 25, 2009 |
|--------|--|

SITE FORMS AND CARDS

| | |
|--------|---|
| FORM 1 | CA-SCI-156 (P-43-000168) |
| FORM 2 | CA-SCI-157 (P-43-000169) |
| FORM 3 | CA-SCI-593 (P-43-000588) [Includes recent aerial photo with probable burial location; S-4296, S-8115, Cartier and Felippo 1987; Cartier and Filippo 1988; S-15929, S-15947] |
| FORM 4 | P-43-001136, Berryessa Creek Reburial location |
| CARD 1 | C-167, midden deposit; in/adjacent, may be part of CA-SCI-593 |

1.0 INTRODUCTION AND SUMMARY

This *Historic Property Survey Report/Finding of Effect* (HPSR/FOE) report represents the identification and evaluation effort and application of effect completed for the proposed Berryessa Creek Project (Undertaking) Reaches 1-9 from Calaveras Boulevard (State Highway 237) south and easterly to Old Piedmont Road in the Cities of Milpitas and San Jose, Santa Clara County.¹ The U.S. Army Corps of Engineers (Sacramento District), in association with its local partner the Santa Clara Valley Water District, is proposing various flood channel improvements along an approximate four mile alignment of Berryessa Creek extending from Calaveras Boulevard on the north, to the Montague Expressway on the south and then trending west to Old Piedmont Road.

The project scope of work for the project's technical report required: an updated records and literature search; a pedestrian survey of the Area of Potential Effects (APE); test excavation of CA-SCI-593 (P-43-000588); preparation of an updated site record form; recordation of all previously unrecorded cultural resources if any; recommendation(s) of National Register eligibility, and a finding of effect pursuant to Section 106 of the National Historic Preservation Act of 1966 as Amended, and its implementing regulations 36 CFR Part 800. This document focuses only on the results of the archival search and pedestrian survey.²

This report has been prepared to meet applicable federal regulatory requirements for historic properties (cultural resources) which require the identification and evaluation of cultural resources that could be affected by the undertaking. The Corps is the NEPA responsible entity and is required to complete the federal regulatory requirements for cultural resources pursuant to Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) (16 U.S.C., Section 470f) and its implementing regulations 36 CFR Part 800. The regulations require a federal agency with jurisdiction over a federal, federally assisted or federally licensed undertaking to take into account the effort of the undertaking on properties listed on or eligible for the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking.

This HPSR/FOE provides supporting materials for the Section 106 identification and evaluation including the results of a records search, a review of pertinent literature, partial consultation Native Americans, and a field review and requests the SHPO to concur that: (1) the identification effort is complete pursuant to 36 CFR Part 800.4(a)-(c); (2) a finding of *Historic properties affected* (36 CFR Part 800.4(d)(2)); and, (3) the proposed project - construction including excavation through the site - constitutes an adverse effect.

-
1. Basin Research Associates project personnel meet or exceed the standards of the Secretary of the Interior and consisted of: archaeologists Dr. Colin I. Busby (Ph.D., Principal), Dr. Donna M. Garaventa (Ph.D., Researcher/compiler), Mr. Christopher Canzonieri (M.A., Physical Anthropologist and Archaeologist), Mr. Stuart Guedon (M.A., Historic Geographer and Archaeologist), Ms. Melody Tannam (B.A., GIS Specialist and Archaeologist), and Ms. Johanna E. Twigg (M.S.).
 2. The Corps has postponed proposed archaeological test excavations at CA-SCI-593.

1.1 SUMMARY OF FINDINGS

One historic property, prehistoric archaeological site CA-SCI-593 (P-43-000588) which appears eligible for inclusion on the NRHP was identified in the APE as result of archival research and a field inventory.

1.1A Identification Effort

The identification effort included archival research, a review of pertinent literature, a systematic archaeological field inventory of the project alignment and consultation with the Native American Heritage Commission (NAHC). Four resources are present within or adjacent to the alignment and include three prehistoric archaeological sites and one reported but not recorded prehistoric resource that may be associated with one of the recorded sites:

CA-SCI-156 (P-43-000168), a "flake scatter" (a single flake and two shells with some possible fire-affected rock) recorded within portions of Reaches 7/8 was not relocated during the archaeological inventory.

CA-SCI-157 (P-43-000169) an "open ? artifact [not described]; adjacent to Bypass Alternatives 1 and 2. Isolated artifact was not relocated.

CA-SCI-593 (P-43-000588), prehistoric site with reported Native American burials was relocated in Reach 3.

A reported but unrecorded cultural resource, C-167, identified as a midden deposit in Reach 3 was not relocated. C-167 may be part of CA-SCI-593 based on previous research.

1.1B Finding of Effect

One historic property, prehistoric site CA-SCI-593 (P-43-000588) in Reach 3, appears eligible for inclusion on the National Register of Historic Places under criterion d. The proposed flood control measures may adversely affect this archaeological resource (36 CFR Part 800.5(a)(1-2)). A finding of *Historic properties affected* (36 CFR Part 800.4(d)(2)) is appropriate since the proposed undertaking may adversely affect a historic property listed, determined eligible or potentially eligible for the National Register of Historic Places.

1.2 RECOMMENDATIONS

The extent of CA-SCI-593 is not known. It is probable that the resource includes a larger portion of Berryessa Creek and extends into the surrounding area east of the present channel. Presence/absence testing is recommended prior to construction to determine the horizontal and vertical extent of the site and provide an indication of site integrity. This action will complete the identification and evaluation effort and allow the Corps and its local partner to plan for future mitigation due to potential construction impacts.

1.3 MITIGATION MEASURES

The proposed project has not yet been designed. It is expected that a *Memorandum of Agreement* between the U.S. Army Corps of Engineers (Sacramento District) and their local partner the Santa Clara Valley Water District and the State Historic Preservation Officer will be developed and negotiated to treat any adverse effects to the Nation Register of Historic Places eligible resource.

2.0 LOCATION AND DESCRIPTION

The U.S. Army Corps of Engineers (Sacramento District) (Corps), in association with its local partner the Santa Clara Valley Water District, is proposing various flood channel improvements along an approximate four mile alignment of Berryessa Creek (the undertaking) extending from Calaveras Boulevard (State Highway 237) on the north (Reach 1) south crossing Montague Expressway³ continuing south and then southeasterly and easterly to Old Piedmont Road (Reach 9) in the Cities of Milpitas and San Jose, Santa Clara County⁴ (United States Geological Survey [hereafter USGS], Milpitas, Calif[ornia] 1980 and Calaveras Reservoir, Calif[ornia], 1980, Township 6 South, Range 1 East, Unsectioned) [Figs. 1-3].

The Corps scope of work for the project's technical report required: an updated records and literature search; a pedestrian survey of the Area of Potential Effects (APE); test excavation⁵ of CA-SCI-593 (P-43-000588); the preparation of an updated site record form; recordation of all previously unrecorded cultural resources if any; recommendation(s) of National Register of Historic Places eligibility; and, a finding of effect pursuant to Section 106 of the National Historic Preservation Act of 1966 as Amended, and its implementing regulations 36 CFR Part 800.

2.1 AREA OF POTENTIAL EFFECTS (APE)

The Area of Potential Effects (APE) consists of nine reaches (Reaches 1-9) starting at Calaveras Boulevard (State Highway 237) south to Cropley Avenue and then trending east along the existing Berryessa Creek to just east of Piedmont Road. In addition, there are two Bypass Alternatives. Bypass Alternative 1 extends along Cropley Avenue⁶ from Reach 5 to the division between Reaches 7 and 8. Bypass Alternative 2 extends from the division between Reach 6-7 northeasterly to and along Cropley Avenue to the division between Reaches 7 and 8. Reaches 1 to part of Reach 4 are located in the City of Milpitas; part of Reach 4 to Reach 9 and Bypass Alternatives 1-2 are located in the northeastern portion of the City of San Jose [see Figs. 2-3].

3. Montague Expressway west of I-680; Landess Avenue east of I-680.

4. Reach 0 located north of Calaveras Boulevard north to Calera Creek/Lower Penitencia Creek is not part of the APE.

5. The Corps has postponed proposed archaeological test excavations at CA-SCI-593.

6. Note: the USGS topographic quadrangle maps use Cropley "Road."

The APE extends a minimum of approximately 10 feet (3 meters) from the top of the creek bank to a maximum area of approximately 177 feet (54 meters) on the east side of the creek to the railroad (e.g., Reach 3 vicinity of CA-SCI-593 (P-43-000588)). The urban Bypass Alternatives 1 and 2 alignments are limited to the proposed alignment, mostly along Cropley Avenue.

Reaches 1-9 and Bypass Alternatives 1 and 2 were subject to an archaeological survey for this report [see Figs. 3 and 6].

Reaches 1-9

Reach 1 - Calaveras Boulevard to Los Coches Bridge

Reach 2 - Los Coches Bridge to Piedmont Creek

Reach 3 - Piedmont Creek to Montague Expressway

Reach 4 - Montague Expressway to I-680

Reach 5 - I-680 to Morrill Avenue

Reach 6 - Morrill Avenue to Secondary Sedimentation Basin

Reach 7 - Secondary Sedimentation Basin to Cropley Avenue

Reach 8 - Cropley Avenue to Old Piedmont Cul de Sac

Reach 9 - Old Piedmont to Upper Project Boundary

Alternatives

Bypass Alternative 1 - from the westerly trending portion of Reach 5 along Cropley Avenue crossing Piedmont Road to Berryessa Creek

Bypass Alternative 2 - from Reach 6/7 northeasterly to Cropley Avenue, along Cropley Avenue crossing Piedmont Road to Berryessa Creek

3.0 REGULATORY CONTEXT

This report has been prepared to meet applicable federal regulatory requirements for historic properties (cultural resources) which require the identification and evaluation of cultural resources that could be affected by the project. Cultural resources include prehistoric and historic archaeological sites, districts and objects; standing historic structures, buildings, districts and objects; and locations of important historic events or sites of traditional/cultural importance to various groups. The analysis of cultural resources can provide valuable information on the cultural heritage of both local and regional populations.

The proposed undertaking must comply with Section 106 of the National Historic Preservation of 1966 (NHPA) and its implementing regulations 36 CFR Part 800 which requires a federal agency with jurisdiction over a federal, federally assisted or federally licensed undertaking to take into account the effect of the undertaking on properties listed on or eligible for the National Register of Historic Places (National Register) and prior to approval of an undertaking to afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking.

The U.S. Army Corps of Engineers, Sacramento District (Corps) is the lead federal agency, the Santa Clara County Water District is the lead state agency and the California State Historic Preservation Officer (SHPO) is the reviewing party.

4.0 BACKGROUND REVIEW

4.1 ENVIRONMENTAL SETTING

The project alignment is located within the northern Santa Clara Valley defined as an approximately northwest-southeast trending very gently sloped geosstructural trough about 105 km (65 miles) long, stretching in the north from about the present Santa Clara County line, south to a point about 10 km (6.2 miles) south of the town of Hollister, where the San Benito River meets a widening alluvial plain. The trough is bounded on the east by the Mt. Hamilton and San Carlos ranges, both segments of the Diablo Range, which separates the Santa Clara Valley from the Great Interior or Central Valley. On the west, the boundary coincides with the Santa Cruz Mountains, in the north, and the Gabilan Range, to the south. These two ranges are separated by an impressive wide canyon or valley.

A number of major land cover types were present in the valley prior to Euro-American development. The types included freshwater marshes, wet and alkali meadows, willow groves, and valley oak savanna in addition to riparian habitat, grasslands and tidal flats along the bay. These all experienced significant declines over the past 150 years with impacts on both the native plant and animal communities. In addition, water and flood control projects have resulted in significant vegetation and channel changes along the major water courses including Coyote Creek and the Guadalupe River.

The valley climate is Mediterranean and is characterized with warm summers, and wet winters although the surrounding mountains and proximity to the Pacific Ocean moderate the weather (Broek 1932). In addition, there is at least three times as much rainfall in the wettest month as during the driest summer month with an average of 10-20 inches per year. During the summer, winds from the usual high pressure area off the coast flow into the valley from the direction of San Francisco Bay, as well as through a relatively low part of the Santa Cruz Mountains west of Los Gatos and through the Pajaro Gap.

The valley has experienced a number of climatological and physiographical changes over the past 10,000 years due to climatic change and earthquakes. Sea levels began to rise due to glacial melting until about 6000 years ago and then started to decline although land subsidence probably continued. By about 4000 years ago, San Francisco Bay had almost attained its present outline and marshes were forming, for example, at the mouths of the present-day Coyote Creek and Guadalupe River.

4.1A Local Setting

The project area is within a flat floodplain which extends south from the San Francisco Bay marshes and terminates/begins in the foothills of the Los Buellis Hills. The alignment ranges from 25-30 feet in elevation (Reach 1) gradually rising toward the

foothills of the Los Buellis Hills, ending with an elevation of 240 feet (Reach 9) (USGS Milpitas, Calif. 1980 and Calaveras Reservoir, Calif. 1980) [Fig. 2].

The primary drainage of the area, the Guadalupe River is approximately 2.4 miles west of the alignment and drains into San Francisco Bay via Alviso Slough to the north. Coyote Creek, approximately 1.6 miles west of the alignment is also a major drainage within the Santa Clara Valley and is roughly 1.8 miles to the east of the Guadalupe River. It is the longest stream flowing out of the Diablo Range into the San Francisco Bay margin. Subsidiary creeks within or crossed by the project alignment include: the Arroyo del los Coches at the southern end of Reach 1/northern end of Reach 2, Piedmont Creek at the southern end of Reach 2/northern end of Reach 3. Culverted Sweigert Creek flows into Reach 7 of Berryessa Creek (Sowers and Thompson 2005) [see Figs. 2-3].

During the Late Pleistocene, the Guadalupe was an embedded river, but in more recent times (since the stabilization of the San Francisco Bay shoreline) has become an aggrading river (see Atwater et al. 1977). The shifting, meandering nature of the Guadalupe River also produced a subtly uneven topography throughout the floodplain. Small basins and other slight topographic depressions played a key role in the ecology and subsistence patterns of the area. In 1963, however, the Guadalupe River channel was straightened, dredged, and its levees built up substantially as part of a flood control program.

Coyote Creek is the dominant physical feature along the eastern edge of the Santa Clara Valley with a length of 26 miles across the plain. In contrast to the perennial waters of the Guadalupe River, Coyote Creek was dry at the surface most of the year. It was bordered by broad benches or terraces creating a barrier to transportation and growth. The stream channel was a barrier to high flows along most of its length and flooding does not seem to have been a problem until the early 20th century due to flood control and urban expansion. In the project area, stream morphology was a relatively shallow, meandering channel characteristic of a slow-moving perennial lowland stream with periodic flooding due to high water flows. The creek terminated at the Alviso Slough creating a brackish and freshwater tidal marsh (see Grossinger et al. 2006).

The native environment was basically a low grassland dotted with spring-fed marshes and basins. A number of ecotones exist within a few miles of the project area, including riverine grassland, grassland/saltmarsh, grassland/fresh-water marsh, grassland/oak plain, saline tidal zones, and fresh-water shrub/tree microhabitats (see Fentress in Cartier (ed.) 1979:58b; also Mayfield 1978, 1980).

Berryessa Creek

Berryessa Creek has been subject to channelization, stream maintenance, and erosion control. Reaches 1-6 of the Berryessa Creek APE consist of modified/channelized alignment with flood control features (e.g., cement channel around curves) with a minimally modified profile through the residential Reaches 7-8 and Reach 9. The terrain along the banks of Berryessa Creek rises gently until it is steep and hilly at Reaches 8 and 9 on the western slope of the Los Buellis Hills (part of the Diablo Range).

The study area includes light industrial, commercial, and residential properties along with a Berryessa Creek Park.⁷ The APE crosses a number of streets/roads including the Montague Expressway at Reach 3/4 and I-680 by Reach 5. In addition, Reach 3 is crossed by various Union Pacific Railroad spurs that serve various facilities in the City of Milpitas.

4.1B Topography/Sedimentary Context

Geological mapping indicates that the project area surface deposits are Holocene alluvium (see Witter et al. 2006). Recent mapping by Witter et al. (2006) shows the majority of the alignment within Holocene alluvial fan deposits (less than 11,800 years old) and modern stream channel deposits (Qhc; less than 150 years) which consist of fluvial deposits within an active, natural water channel (Witter et al. 2006) [Fig. 5].

4.2 NATIVE AMERICAN

Cultural resources are traces of human occupation and activity. In northern California, cultural resources extend back in time for at least 9,000-11,500 years with Native American occupation and use of the Santa Clara Valley extending over 5,000-8,000 years and possibly longer.

4.2A Prehistoric

The project area is located within an area favored by Native Americans for both occupation and hunting and collecting activities. The area would have provided a favorable environment during the prehistoric period with riparian and inland resources readily available and the bayshore in relative close proximity. Native American occupation sites appear to have been selected for accessibility, protection from seasonal flooding, and the availability of resources for both food and industrial use.

Archaeological information for the general Bay Area suggests a slow steady increase in the prehistoric population over time with an increasing focus on permanent settlements with large populations in later periods. This change from hunter-collectors to an increased sedentary lifestyle is due to more efficient resource procurement as well as a focus on staple food exploitation, the increased ability to store food at village locations, and the development of increasing complex social and political systems including long-distance trade networks.

Prehistoric site types recorded in the valley include habitation sites ranging from villages to temporary campsites, stone tool and other manufacturing areas, quarries for tool stone procurement, cemeteries usually associated with large villages, isolated burial sites, rock art locations, bedrock mortars or other milling feature sites, and trails (Elsasser 1986:32).

Archaeological research in the region has been interpreted using several chronological schemes based on stratigraphic differences and the presence of various cultural traits. A

7. Berryessa Creek Park is located in Reach 7 along the south bank of the creek between Baywood Square on the west and Minto Drive on the east.

three-part cultural chronological sequence, the Central California Taxonomic System (CCTS) was developed by archaeologists to explain local and regional cultural change in prehistoric central California from about 4,500 years ago to the time of European contact (Lillard et al. 1939; Beardsley 1948, 1954). This classification scheme, consisting of three horizons - Early, Transitional and Late, has been revised although the prior nomenclature (Early, Middle, Late Horizon) is still in common use (see Fredrickson 1994). Moratto (1984) suggests the Early Horizon dated to ca. 4,500 to 3,500/3,000 years ago with the Middle Horizon dating to circa 3,500 to 1,500 years ago and the Late Horizon dating to circa 1,500 to 250 years ago [see Table 1]. Allen (1999) has presented a four-period chronological framework for the Northern Santa Clara Valley/Southern San Francisco Bay region using the Bennyhoff and Hughes (1987) taxonomy as revised by Milliken and Bennyhoff (1993) and Fredrickson (1994) [see Table 2].

The **Early Horizon** is the most poorly known of the periods. Basic Early Horizon traits include hunting and fishing for subsistence and the presence of milling stones for vegetal food processing, use of the atlatl (i.e., throwing board and spear), and a relative absence of fire-altered rock, greasy midden, organic soil, charcoal, and ash in the middens (culturally affected soils). Early Horizon cultures practiced elaborate burial rituals and placed a wealth of goods in graves of the dead. Well-developed trade networks with other areas of the Pacific Coast and Sierra Nevada were also developed by this time. It is believed that the initial occupation of central California was by Hokan-speaking peoples.

Middle Horizon sites are more common and are relatively better known than Early Horizon sites. These sites usually have deep, stratified deposits that contain large quantities of ash and charcoal, fire-altered rock, and fish, bird, and mammal faunal remains. The presence of significant numbers of mortars and pestles is suggestive of a growing reliance upon gathered plant foods as opposed to hunted animal foods. The aboriginal populations were unchanged from Early Horizon peoples. Burials were usually flexed and only a small proportion of the graves contained artifacts, which were usually utilitarian. An increase in violence is suggested by the number of Middle Horizon burials found with projectile points embedded in the bones or with other marks of violence.

The **Late Horizon** emerges from the Middle Horizon with the continued use of many early traits and the introduction of several new traits. Late Horizon sites are the most numerous and are composed of rich, greasy midden with bone and fire-altered rocks. Use of the bow and arrow, flexed interments, deliberately damaged ("killed") grave offerings, and occasional cremation of the dead are among the known traits of this horizon. Dietary emphasis on acorns and seeds is evident in this horizon. Trade with surrounding and other areas was well established for various raw materials. Compared to earlier peoples, Late Horizon groups were short in stature with finer bone structure, evidence perhaps of the replacement of original Hokan-speaking settlers by Penutian-speaking groups by circa 1,500 years ago.

General overviews and perspectives on the regional prehistory including chronological sequences can be found in C. King (1978a), Moratto (1984), Elsasser (1978, 1986), Allen (1999), Jones and Klar (2007). See Hylkema (2002) for detail regarding environment and chronology for selected archaeological sites from the southern San Francisco Bay

and the peninsula coast; Milliken et al. (2007) for chronological and taxonomic issues; Hughes and Milliken (2007); and, Milliken and Schwitalla (2009) for a concordance of time periods, patterns, and aspects in the San Francisco Bay Area and selected artifact sequences charts.

TABLE 1
Hypothesized Characteristics of Cultural Periods in California

Table 1 - Hypothesized Characteristics of Cultural Periods in California

| | |
|---|---|
| 1800 A.D. Upper Emergent Period Phase 2, Late Horizon | Clam disk bead money economy appears. More and more goods moving farther and farther. Growth of local specializations relative to production and exchange. Interpenetration of south and central exchange systems. |
| 1500 A.D. Lower Emergent Period Phase 1, Late Horizon | Bow and arrow introduced replace atlatl and dart; south coast maritime adaptation flowers. Territorial boundaries well established. Evidence of distinctions in social status linked to wealth increasingly common. Regularized exchanges between groups continue with more material put into the network of exchanges. |
| 1000 A.D. Upper Archaic Period Middle Horizon Intermediate Cultures | Growth of sociopolitical complexity; development of status distinctions based on wealth. Shell beads gain importance, possibly indicators of both exchange and status. Emergence of group-oriented religious organizations; possible origins of Kuksu religious system at end of period. Greater complexity of exchange systems; evidence of regular, sustained exchanges between groups; territorial boundaries not firmly established. |
| 500 B.C. Middle Archaic Period Middle Horizon Intermediate Cultures | Climate more benign during this interval. Mortars and pestles and inferred acorn economy introduced. Hunting important. Diversification of economy; sedentism begins to develop, accompanied by population growth and expansion. Technological and environmental factors provide dominant themes. Changes in exchange or in social relations appear to have little impact. |
| 3000 B.C. Lower Archaic Period Early Horizon Early San Francisco Bay Early Milling Stone Cultures | Ancient lakes dry up as a result of climatic changes; milling stones found in abundance; plant food emphasis, little hunting. Most artifacts manufactured of local materials; exchange similar to previous period. Little emphasis on wealth. Social unit remains the extended family. |
| 6000 B.C. Upper Paleo-Indian Period San Dieguito Western Clovis 8000 B.C. | First demonstrated entry and spread of humans into California; lakeside sites with a probable but not clearly demonstrated hunting emphasis. No evidence for a developed milling technology, although cultures with such technology may exist in the state at this time depth. Exchange probably ad hoc on one-to-one basis. Social unit (the extended family) not heavily dependent on exchange; resources acquired by changing habitat. |

TABLE 2
Comparison of California Cultural Period with Temporal Phases of Central California
(Allen 1999)

| <i>Cultural Periods</i> (Fredrickson 1994) | <i>Dating Scheme B1</i> (Bennyhoff and Hughes 1987) | |
|---|--|-----------------------|
| | Year | Time Period |
| EMERGENT PERIOD | | Historic Period |
| | AD 1800 | |
| | AD 1700 | Late Period Phase 2-B |
| | AD 1500 | Late Period Phase 2-A |
| | AD 1300 | Late Period Phase 1-C |
| | AD 1100 | Late Period Phase 1-B |
| | | Late Period Phase 1-A |

TABLE 2, con't
Comparison of California Cultural Period with Temporal Phases of Central California
(Allen 1999)

| <i>Cultural Periods</i> (Fredrickson 1994) | <i>Dating Scheme B1</i> (Bennyhoff and Hughes 1987) | |
|---|--|----------------------------------|
| | Year | Time Period |
| UPPER ARCHAIC PERIOD | AD 900 | |
| | | Middle/Late Period Transition |
| | AD 700 | Middle Period Terminal Phase |
| | AD 500 | Middle Period Late Phase |
| | AD 300 | Middle Period Intermediate Phase |
| | AD 100 | Middle Period Early Phase |
| | 200 BC | Early/Middle Period Transition |
| | | |
| MIDDLE ARCHAIC PERIOD | 500 BC | |
| | | Early Period |
| | 3000 BC | |
| LOWER ARCHAIC PERIOD | | |
| | 6000 BC | |
| PALEOINDIAN PERIOD | | |
| | 8000 BC | |

4.2B Ethnographic

The aboriginal inhabitants of the Santa Clara Valley belonged to a group known as the "Costanoan", derived from the Spanish word *Costanos* ("coast people" or "coastal dwellers") who occupied the central California coast as far east as the Diablo Range.⁸

In 1770 the Costanoan lived in approximately 50 separate and politically autonomous tribelets with each group having one or more permanent villages surrounded by a number of temporary camps. Physiographic features usually defined the territory of each group which generally supported a population of approximately 200 persons with a range of between 50-500 individuals (Kroeber 1925:462; Levy 1978:485, 487; Hart 1987:112-113).

8. The term Costanoan, as applied by anthropologists, does not imply the existence of a politically unified entity, but rather, refers to different groups of people who shared similar cultural traits and belonged to the same linguistic family. An estimated 200+ and possibly more persons of partial Costanoan descent currently reside in the greater San Francisco Bay Area; these individuals now generally prefer the term *Ohlone* to the anthropologists' Costanoan (A. Galvan, personal communication 1990). See also Galvan (1967/1968), Margolin (1978), Bean (1994).

Tribelet boundaries and village locations are inexact due to incomplete historic records, and they remain a subject of anthropological contention and debate. The APE may have been situated within the former territory of the *Alson*, "*Santa Ysabel*"⁹ and/or possibly *Tamyen* (*Tamien*) subgroup of the Costanoan Indians (Kroeber 1925; Levy 1978:485, Fig. 1; Milliken 1983:139, Map 4; Milliken 1995:229, Map 5, 235, 256; Hylkema 1995:35-36, Map 6; Hart 1987:324).

Following Milliken (1995), the *Alson* "held the low marshlands at the very southern end of San Francisco Bay, probably both north and south of the mouth of the Coyote River, now the cities of Newark, Milpitas, and Alviso." This group was known as the "*Santa Agueda*"¹⁰ at Mission Santa Clara, established in 1777 and had been "nearly depleted" prior to the 1797, the year Mission San Jose was established in present-day Fremont. The "*Santa Ysabel*" held the eastern Santa Clara Valley and part of the upper Calaveras Creek drainage in the hills to the east with Coyote Creek on the west with their center at present-day Alum Rock on Penitencia Creek. Two specific villages of this group are found in Mission Santa Clara registers between 1777 to 1808, *Ottasimin* and *Socotach* (Milliken 1983:100-101; Milliken 1995:253; Milliken et al. 2007:100, Fig. 8.1). None of the ethnographic settlements mapped by Kroeber (1925) or Levy (1978) are situated in the vicinity of the APE.

Historic accounts of the distribution of tribelets and villages in the 1770s-1790s and the results of archaeological research in the area suggest that Native Americans may have had numerous temporary camps within the vicinity of the project throughout the prehistoric period and into the Hispanic Period. Unfortunately, extensive ethnographic data on the Costanoans are lacking and the aboriginal lifeway apparently disappeared by approximately 1810 due to introduced diseases, a declining birthrate, the cataclysmic impact of the mission system and the later secularization of the missions by the Mexican government (Kroeber 1925; King and Hickman 1973; Levy 1978).

For a more extensive review of the Costanoan see Kroeber (1925:462-473), Harrington (1942), King and Hickman (1973), C. King (1974, 1977, 1978b), Elsasser (1986), Levy (1978:485-495), Bean (1994), Brown (1994) and Milliken (1995).

4.3 HISTORIC ERA

4.3A Hispanic Period

The Spanish philosophy of government in northwestern New Spain was directed at the founding of presidios, missions, and secular towns with the land held by the Crown (1769-1821), while the later Mexican policy (1822-1848) stressed individual ownership of the land. After the secularization of the missions was declared by Mexico in 1833, vast tracts of the mission lands were granted to individual citizens (Hart 1987).

9. Steiner and Quick (1986/S-8270) place the APE within Santa Ysabel territory, noting that Mission Santa Clara records suggest that the main village "was along Coyote Creek, probably at a point where Upper Penitencia Creek flowed into it."

10. Note Hylkema (1995:36, Map 6) shows the Santa Agueda north of Mission San Jose on the south side of Alameda Creek.

Spanish explorers in the late 1760s and 1770s were the first Europeans to traverse the Santa Clara Valley. The first party, led by Gaspar de Portola and Father Juan Crespi, arrived in the Alviso area in the fall of 1769. Sergeant Jose Francisco Ortega of their party explored the eastern portion of San Francisco Bay and likely forded both the mouth of the Guadalupe River and Coyote Creek (Beck and Haase 1974:#16-17; James and McMurry 1933:8). The following year, 1770, Pedro Fages led another party through the Santa Clara Valley and in 1772 Fages returned with Crespi. A few years later, in 1776, Juan Bautista de Anza and Father Pedro Font traveled through the region and their favorable reports led to the establishment of both Mission Santa Clara and the Pueblo San Jose de Guadalupe in 1777.

As mapped by Beck and Haase (1974:#17), Ortega's 1769, Fages' 1770, and Anza-Font's 1776 expeditions would have crossed Reach 0 just north of present-day State Highway 237/Calaveras Boulevard. The 1776 Juan Bautista de Anza route, a designated National Historic Trail as mapped by the National Park Service (USNPS 1995), crosses Reach 0 just north of present-day State Highway 237/Calaveras Boulevard.

Mission Santa Clara de Asis, founded 1777, was the eighth of the 21 missions in California and one of seven missions located within Costanoan territory. Mission Santa Clara would have been the mission with the greatest impact on the aboriginal population living in the project vicinity. The Pueblo of San Jose also founded in 1777 was the first *pueblo* in Alta California - civilian settlement - founded to administer and coordinate the missions and presidios in the province (Hall 1871:48; Hart 1987:446, 454).

Ranchos, Tracts, and Roads

The APE south of Calaveras Road to Cropley Avenue is located within the former *Rancho Milpitas* (Alviso) and far northwest portion of former Pueblo Lands of San Jose de Guadalupe. The project and vicinity would have been suitable for grazing cattle, the major economic pursuit of the Santa Clara Valley and California during the Hispanic Period (Stratton 1862; Thompson 1866; Hendry and Bowman 1940; USGS 1980).

*Rancho Milpitas*¹¹ (Berreyesa) [sic] was granted by Pedro Chaboya, *Alcalde*¹² of San Jose in May 1834 to Nicolas Berreyesa [sic],¹³ but was rejected. Chaboya was *Alcalde* in 1836, at the same time Nicolas Berryessa (1761-1804) was a member of the Anza expedition (1776), a *regidor*¹⁴ of the Pueblo of San Jose, and married Gracia Padilla (a

11. Variouslly:

Milpita - town or vegetable gardens (Perez 1996:246);

Milpitas - Nahuatl (Aztec) for "Corn Patches" or "Little Corn Fields" (Arbuckle and Rambo 1968:23); or

Milpitas - "maize field" (Hoover et al. 1966:443).

12. *Alcalde* - "Municipal officer with administrative and judicial functions." (Barnes et al. 1981:131)

13. Variouslly spelled Berryessa, Berryesa or Berreyesa and also Berrelleza in Gudde (1998:34).

14. a member of the *cabildo* or "municipal corporation of town council charged with local municipal government (Barnes et al. 1981:133, 137

member of the Peralta family) and had eleven children. As a result, the family had large landholdings in the present-day counties of Santa Clara, Napa, Alameda, and Sonoma. Berryessa's [*sic*] life was problematic - he was subject to the predations of John C. Fremont's battalion during the Bear Flag Rebellion who not only "plundered" his cattle, but killed the son of his brother, Jose de los Reyes near San Rafael in June 1846. In addition, he had problems with squatters and his claim for Rancho Milpitas was rejected. Berryessa died insane in 1863 (Hoover et al. 1966:443-444; Egan 1977:543, #33).¹⁵

After *Rancho Milpitas* had been granted by Alcalde Pedro Chaboya to Nicolas Berreyesa in 1834, Governor Castro granted *Rancho Milpitas* (Alviso) in September and October 1835 to Jose Maria Alviso. After a dispute with Jose Higuera about the boundary with *Rancho Tularcitos*, the Arroyo de los Coches was designated the northern boundary of *Rancho Milpitas*. The *Rancho Milpitas* was patented to the heirs of Jose Maria Alviso in June 30, 1871. None of the known Hispanic era dwellings or other cultural features were located in or adjacent to the APE (Stratton 1862; Hendry and Bowman 1940:856-863; Hoover et al. 1966:444; Arbuckle and Rambo 1968:23-24; USGS 1980).

Potential Hispanic Era Resources

Four Berryessa Palizada¹⁶ Dwelling Sites, dating to the early 1830s (prior to 1833) initially appear to have been built in/adjacent to Reach 9 ". . . in a row on the south bank of Berreyesa Creek just west of Piedmont road [Old Piedmont Road (US War Dept 1943)] and two miles south of the Alviso adobe and the Calaveras road. One of two of them may have been within the boundaries of the Milpitas grant as patented" (Hendry and Bowman 1940:862, H&B #18-21). However, historic maps indicate that these structures were located not in or adjacent to Berryessa Creek, Reach 9, but rather were situated south of Rancho Milpitas within the Pueblo Lands of San Jose. The 1850-1851, 1853, and 1857 maps show eastern and southern rancho boundaries that differ from the rancho as patented. The southern boundary of Rancho Milpitas/Milpitas Rancho as patented is along Cropley Avenue and not about 0.4 miles south as shown on the early 1850s maps.

The 1850-1851 Sherman Day map of *Rancho de las Milpitas* places a cluster of four "Berryeza" buildings approximately 0.25 miles south of Berryessa Creek close to the rancho boundaries granted to Alviso.¹⁷ This map also shows "Berryeza's Garden" approximately 0.7 miles west of these buildings adjacent to the south bank of the creek east of Morrill including a small part of APE Reach 7. A building owned by "Jaques"

15. Namesakes include Berryessa Creek, settlement of "Berryessa" (within the former Pueblo Lands of San Jose to the Pueblo of San Jose), a school, and road in Santa Clara County, as well as a valley and artificial lake in Napa County (Hart 1987:46).

16. Impermanent dwellings - a Spanish variant of the Kentucky log house, were "constructed of poles set upright in the ground and bound together with leather thongs; it was roofed with earth or thatch and sometimes whitewashed in the interior with lime made from sea shells." These structures were not very durable and were normally replaced with adobe brick buildings as soon as conditions permitted the construction of permanent buildings (Kirker 1973:2).

17. As patented the southern rancho boundary is about 0.4 mile further north along Cropley Avenue. As a result, the cluster is situated within in Pueblo Lands.

was located about mid-point on the southern boundary of the garden about 0.25 miles south of the APE. An 1853 White map also places three "Berriesys" [?spelling] buildings in about the same location south of an "arroyo" [present-day Berryessa Creek]. The 1857 Thompson *Map of the Milpitas Rancho* shows a single "Berreyesa's House" between two "arroyo" (e.g., Berryessa and Penitencia creeks) which flowed though the eastern rancho boundary.

4.3B American Period

The population of the Santa Clara Valley expanded as a result of the Gold Rush (1848), followed later by the construction of the railroad to San Francisco (1864) and the completion of the transcontinental railroad in 1869. Throughout the late nineteenth century in the Santa Clara Valley, rancho, Pueblo, and mission lands were subdivided as the result of population growth, the Anglo-American takeover, and the confirmation of property titles. Prior to the legal resolution of titles, the transfer of real estate was extremely risky. Large cattle ranches were converted to farming varied crops, and this agricultural land-use pattern continued throughout the American Period.

During the early American Period (1847-1876) stock raising predominated, but declined after the drought of 1863-1864, after which wheat-growing became the primary agricultural activity (Bean 1978) along with dairy farms, and orchards in the 1860s-1870s. During this period, the first experiments with horticulture and other crops took place. The arrival of the San Francisco and San Jose Railroad (1863-1864), followed by the development of the refrigerator railroad car (ca. 1880s) had major impacts on the general area. After 1875, the success of many agricultural experiments and expansion of markets via rail encouraged the development of horticulture in the Santa Clara Valley. As a result, during the later American Period and into the Contemporary Period (ca. 1876-1940s), horticulture/fruit production became a major industry. From 1875 onward, the need for an expanding market led to innovations in fruit preservation and shipping including drying fruit, canning fruit, and shipping fresh fruit in refrigerated cars (Findlay 1985:13). In turn, this created a wider economic boom which attracted new residents to the Santa Clara Valley (Broek 1932:76-83; Hart 1987).

Reaches 1 to 4 are in the City of Milpitas while a portion of Reach 4 and Reaches 5-9 and Bypass Alternatives 1-2 are located in the northeastern part of the City of San Jose. The county, named after Mission Santa Clara, was one of the original 27 counties of California. San Jose has been the county seat since the beginning and was not only the first pueblo in Alta California, but also the first capital of the State of California. Within the Santa Clara Valley, the City of San Jose, founded in 1777 under Spanish authority, served as a County seat, a primary service as well as financial and social center. Most of the institutions for higher education and the citizen elite resided in San Jose or its twin, the city of Santa Clara (Broek 1932; Hendry and Bowman 1940:750; Hoover et al. 1966:425; Hart 1987:445-446; Patera 1991:188).

San Jose has functioned as the "chief city" annexing former smaller rural settlements such as Berryessa. The Pueblo of San Jose, located in what is now downtown San Jose from about E. Julian south to San Salvador, later expanded to include the former

settlement of **Berryessa**,¹⁸ named in honor of Nicolas Berryessa, initially about four miles northeast of San Jose. The small village of Berryessa was situated in a noted "rich fruit region" complete with drying plants. It warranted a post office (May 1889 to October 1904). It included a school, church, store, and blacksmith shop and a number of residences by 1896. The post office was reestablished June 1976 as a classified station of the City of San Jose (*San Jose Mercury* 1896:132; Broek 1932; Hendry and Bowman 1940:Map of Pueblo San Jose about 1803 to 1854; Patera 1991:18; USGS 1980).

Milpitas, approximately five miles northeast of the center of Santa Clara and seven miles north of the center of Pueblo of San Jose was located on the western boundary and named after the Rancho Milpitas. The Town was initially known to the Spanish as "Penitencia," purportedly after the creek to the west named for "a house of penitence, a small adobe building where priests from the mission came at stated intervals to hear confessions" (Hoover et al. 1966:444). It was a "sporting center" for Mexicans living in the general area at least once a year with horse racing, dancing, bull fighting, and other Mexican sports. The historic center of Milpitas, about 0.75 miles west of Reach 1, was on the flatlands inland from of Southern San Francisco Bay at about the confluence of Arroyo de las Coches and Penitencia Creek and along the road east to Calaveras Valley and the north-south mission road, later known as the "Road from Oakland to San Jose." It was initially settled by an Irishman, Michael Hughes in 1852, followed by a store and school in 1855, a post office in May 1856,¹⁹ and hotel in 1857. The soils in the area were exceptionally fertile, peculiarly suited to vegetables and strawberries as well as pears and asparagus. Further east wheat and hay were profitably grown (Stratton 1862; Munro-Fraser 1881:305-306; *San Jose Mercury* 1896:104, 106; Sawyer 1922:296; Hoover et al. 1966:444; Loomis 1986:1; Patera 1991:136).

During the early American Period, the study area was apparently sparsely settled, appropriate for cattle grazing, and later raising crops [see Fig. 4]. As a result, both Milpitas and Berryessa were and still are stops on the rail routes through the general study area. Milpitas was a noted shipping depot (*San Jose Mercury* 1896:106).

Historic Map Review

The 1958 *Soil Map Santa Clara Area - California* (USDA/SCS 1958) shows no Kitchen Middens (Ka) in or adjacent to the APE. This map maps Berryessa Creek westerly to Capitol Expressway. Reaches 0-4/part of 4 did not exist at the time this map was made.

The *Creek & Watershed Map of Milpitas & North San Jose* (Sowers and Thompson 2005) with historical wetlands research by the San Francisco Estuary Institute indicates that only Reaches 6, 7, and 9 east of Morrill Road are "creeks" which have not been engineered or within underground culverts and/or storm drains. This map

18. "Beryessa" [*sic*] was located north of Penitencia Creek in the vicinity of Capital Avenue (Capitol Expressway) and Berryessa Road (e.g., Sawyer 1922:301).

19. as May 31, 1858 in Loomis (1986:7).

places a ca. 1850 willow grove mostly on the west side of Berryessa Creek at the confluence of present-day Los Coches Creek (Sowers and Thompson 2005).

The 1850-1851 Sherman Day Map of *Rancho de las Milpitas* shows the "Road to the Mission San Jose" along Penitencia Creek along with a number of isolated structures and a cluster of four "Berryeza" buildings within the far southeastern part of rancho. This building cluster is mapped at least 0.25 miles south of Berryessa Creek. As patented the southern rancho boundary is about 0.4 mile further north (e.g., Cropley Avenue), thus placing the cluster within in Pueblo Lands. The east part of Reach 7 as well as Reaches 8 and 9 conform to the 1850-1851 "Arroyo del Finado Martines."²⁰ The creek is shown flowing past "Berryeza's Garden" and then northerly through an area of trees into an extensive marshy area. This map indicates that CA-SCI-593 (P-43-000588) was located on the eastern periphery of the trees, east of the marshy area. "Berryeza's Garden" was situated approximately 0.7 miles west of the "Berryeza" buildings adjacent to the south bank of the creek including a small part of Reach 7 within the narrow western portion of Berryessa Creek Park in the vicinity of present-day Castlegate Drive. A building owned by "Jaques" was located about mid-point on the southern boundary of the garden about 0.25 miles south of the alignment.

White's 1853 *Plot representing the Location of School Land Warrants Nos. 135 & 136; also S.O. Houghton's pre-emption Claim of 160 acres* shows area west of the eastern boundary of Rancho Milpitas. This 1853 map places three "Berriesys" buildings in about the same location as the 1850-1851 Sherman Day map, south of an "arroyo" [present-day Berryessa Creek].

Stratton's 1862 Plat of the *Milpitas Rancho* finally confirmed to The Heirs of Jose Maria Alviso shows and labels a "Sausal"²¹ or sink of Milpitas Creek" [Berryessa Creek] and another along the southwestern boundary of the rancho, southwest of Berryessa Creek. No other features are located in the vicinity of the creek. At the time, a "Road from Milpitas to Calaveras Valley" is shown crossing the northern rancho boundary, two road converge on "Milpitas Village", one "Road" from the west side and crossing "Penitencia Creek" and the other the north/south "San Jose & Oakland Road"²² which follows the east side of Penitencia Creek.

Healey's 1866 *Official Map of the County of Santa Clara* provides rancho names, owners, and boundaries and shows structures along the road in Milpitas (not labeled). Calaveras Road/Boulevard (not labeled), the "Arroyo de los Coches," and Berryessa Creek (not labeled) are also shown. The creeks are mapped flowing into

20. rivulet, small stream, or brook of the deceased Martines [former owner Martinez].

21. *Sausal* - grove of willows (Perez 1996:248).

22. Labeled "Road form Oakland to San Jose" as it proceeds through the southwest corner of Rancho Milpitas. Present-day Oakland Road in San Jose and Main Street in Milpitas.

Penitencia Creek after crossing the Western Pacific Railroad (WPRR) San Jose Branch tracks²³ and north/south road through Milpitas from San Jose northward.

Thompson's 1866 *Map of the Pueblo Lands of San Jose* finally confirmed to Mayor and Common Council of the City of the City of San Jose shows "Milpitas" in the northwest corner of Rancho Las Milpitas and "Milpitas CR. [creek]", present-day Berryessa Creek, flowing into "Sausal or sink of the Creek" east of "Penitencia Creek".

Whitney's 1873 *Map of the Region Adjacent to the Bay of Bay Francisco* is similar to Thompson's but does not label the sausal/sink - shown as a moderately illegible map symbol - associated with "Milpitas Cr.". None of the buildings noted on the map appear to have been located in/adjacent to the alignment.

Thompson and West's 1876 *Historical Atlas of Santa Clara County* maps "Berryessa Creek" flowing from the hills into "Penitencia Creek" - and not into a "sausal." Berryessa Creek passes through a number of irregularly shaped tracts crossing "Milpitas and Beryessa Road" [present-day Great Mall Parkway/Capitol Expressway], the "Western Pacific" and "Milpitas Road." From east to west these tracts consist of 186 acres owned by Carmen A. DeNarvez; 270.50 acres owned by Tito de la Roasa; 91.56 acres owned by William Bowman²⁴; 53.71 acres²⁵ and 183 acres owned of Robert Welsh; and, from south to north, a large tract of 1578.93 held acres by Martin Murphy. This map maps and labels rancho boundaries as well as "Milpitas" and "Depot" of the "Western Pacific" and "Oakland Road"/"Milpitas Road" west of the APE (Thompson and West 1876:25).

McMillan's 1905 *Official Map of the County of Santa Clara* shows further subdivision of rancho lands and changes in ownership with "Beryessa Creek" crossing Piedmont Road, "Milpitas Lane" which follows the southern boundary of Rancho Milpitas and currently known as Copley Avenue, and "Landes [*sic*] Avenue," "Capitol Ave," the tracks of the "CPRR" (Central Pacific Railroad), and "Milpitas Road."

The USGS topographic series provides additional information regarding the configuration of Berryessa Creek through time. The 1899 USGS San Jose topographic quadrangle, surveyed in 1895 has "Berryessa Creek" in the hills flowing west a relatively short distance (e.g., midpoint between Old Piedmont Road and Morrill Avenue) [see Fig. 4]. By 1895 Landess Avenue had also been built. Buildings appear to be shown along the creek in/adjacent/near Reach 7 near the hills. The 1943 US War Department San Jose, Calif. topographic quadrangle (photography 1939, topography 1942) shows Reaches 5 and 6 and part of Reach 7 of "Berryessa Creek" still flowing into Penitencia Creek. As in 1895, structures are shown in the

23. Built between 1917-1921; owned by Union Pacific Company (UP) (McMorris et al. 2002/form).

24. Located in Pueblo Tract No. 1.

25. Located in Pueblo Tract No. 1.

vicinity of the hills as well as at least one about midpoint near the south bank of Berryessa Creek (not labeled) between Piedmont Road and Morrill Avenue, two on the north bank of the east side of Morrill Avenue and one on the south bank on the west side of Morrill Avenue. The creek also crosses an unpaved road, a transmission line and then the Western Pacific tracks, etc. west of the alignment.

The 1961 USGS San Jose, Calif. Map shows "Berryessa Creek" passing through orchards flanking "Piedmont Road" to east of "Morrill Road." Orchards were also adjacent to the west bank of the creek in Reach 4 and east bank of Reach 3. By 1961, the channelized north/south section of Reaches 1-4 as well as Piedmont Creek at the boundary of Reaches 2 and 3 had been constructed. At the time, the creek channel proceeded west about 0.25 miles north of Calaveras Road. This westward channel conforms to a channel still shown on the 1980 USGS Milpitas quadrangle. By 1961, a railroad spur crossed the alignment just north of Landess Avenue. As shown on the 1980 USGS Milpitas and Calaveras quadrangles [Fig. 2], the buildings close to the creek on the 1943, 1961 and 1973 quadrangles had been removed by 1980 with the exception of buildings in the vicinity of Piedmont Road. Reach 0 between Calaveras and Jacklin Roads had been constructed/modified between 1973 and 1980. The northernmost portion of Reach 0 on the west side of the railroad tracks from about the north side of Jacklin Road to Calera Creek appears to have been built between 1961 and 1963 (USGS 1899, 1961, 1973, 1980; US War Dept 1943 [photography 1939, topography 1942]).

Map Summary

Berryessa Creek has also been known as "Arroyo del Finado Martines" (Day 1850-1851) and Milpitas Creek (e.g., Stratton 1862; Thompson 1866; Whitney 1873).

Prehistoric archaeological site CA-SCI-593 (P-43-000588) was located on the eastern periphery of trees west of a marshy area shown on Day's 1850-1851 Map of *Rancho de las Milpitas*. A much smaller marshy area, labeled "sausal" or "sink" or marked by a symbol is shown on Stratton's 1862 *Plat of the Milpitas Rancho*, Thompson's 1866 *Map of the Pueblo Lands of San Jose*, and Whitney's 1873 *Map of the Region Adjacent to the Bay of Bay Francisco*. By 1876, Berryessa Creek had been extended west to Penitencia Creek, apparently draining the "sausal" or "sink" (Thompson and West 1876:25).

The northeast corner of the ca. 1850-1851 "Berryessa's Garden" was adjacent to the south bank of Berryessa Creek in Reach 7 within Berryessa Creek Park in the vicinity of present-day Castlegate Drive (Day 1850-1851).

The majority of the alignment of Berryessa Creek has been modified with the exception of part of Reach 7 and all of Reaches 8 and 9 (e.g., east of Castlegate Drive - and definitely from Messina Drive east; Day 1850-1851). Reaches 5 and 6 and part of Reach 7 appear to have been constructed prior to 1942. The channelized north/south Reaches 1-4 portion along with Piedmont Creek at boundary of Reaches

2 and 3 appear to have been constructed 1942 and 1961 (US War Dept 1943; USGS 1961; USDA/SCS 1958 [map]).

4.4 ARCHAEOLOGICAL SENSITIVITY

Research conducted in the northern Santa Clara Valley since the early 1980s has underscored the high potential for buried prehistoric archaeological sites in the vicinity of the Guadalupe River and Coyote Creek as well as other drainages (e.g., see TCR 1980; Findlay and Garaventa 1983; Anastasio 1984; Ambro 1996; Basin Research Associates 1997; see Meyer 2000 for a summary).

The Guadalupe River and Coyote Creek were prime foci of prehistoric occupation in the Santa Clara Valley and Native American use of the project area continued into the Hispanic and American periods. Many of the prehistoric sites recorded in the general project area appear to be "midden" sites²⁶ and include both former mound sites as well as sites now buried under sedimentary soils. A number of the recorded sites have yielded Native American skeletal remains ranging from isolated burials to several hundred individuals associated with prehistoric village locations. Chronologically, occupation in the area clearly ranges from the Middle Archaic Period (3000-500 B.C.) to the Late Emergent Period (A.D. 1800) with many of the sites having multiple occupations through time but non-continuous occupations through time.

The prevalence of buried archaeological sites in the general area is largely due to the repeated overbank flooding of the Guadalupe River and Coyote Creek which have resulted in the deposition of alluvium throughout the area especially in the vicinity of the extant water courses (TCR 1980:24).²⁷ Researchers have noted that there is usually no surface indication of buried prehistoric cultural materials and often the presence of large, complex sites is not clearly suggested by the occasional sparse surface indicators noted during a surface inventory.²⁸

Several researchers in the Santa Clara Valley have noted that the presence/absence of certain soil types may indicate some potential for buried cultural resources. Anastasio (1988) has observed that Upper Archaic Period sites in the Guadalupe River floodplain tend to be associated with basin soils, while the later Emergent Period sites tend to be associated with alluvial soils.

26. The midden deposits are characterized by charcoal flecks, quantities of baked and vitrified clay, fire affected rock, various shellfish remains (especially *Cerithidea californica*), faunal remains, and various chipped and ground stone artifacts.

27. For example, the majority of the sites in north San Jose are found along the Guadalupe River. Most of the sites in the area are capped by native sterile overburden varying from 0.3 to 1.57 meters in depth and were generally exposed during utility trenching and other subsurface construction (Basin Research Associates 1997).

28. Surface indications of prehistoric sites in the area are often the result of disturbance by historic activities that have exposed the buried cultural materials.

4.4A Local Sensitivity

The *Cultural Resources Review for the City of San Jose 2020 General Plan Update* (Garaventa and Guedon 1993) shows Reach 0 and a portion of Reach 5 as not within a sensitive zone while a portion of Reaches 5 and Reaches 6 to 9 within areas of sensitivity for archaeological resources.

5.0 PRE-FIELD IDENTIFICATION EFFORTS

A prehistoric and historic sites records search was completed by the California Historical Resources Information System, Northwest Information Center at California State University (CSU), Sonoma, Rohnert Park (CHRIS/NWIC File No. 08-0825 dated February 25, 2009 by Hagel). In addition, reference material from the Bancroft Library, University of California, Berkeley and Basin Research Associates, San Leandro was also consulted.

The *Historic Properties Directory* for Santa Clara County (CAL/OHP 2008a) available from the CHRIS/NWIC provides the most recent updates of historic property evaluations including the National Register of Historic Places, California Historical Landmarks, and California Points of Historical Interest reviewed by the State of California Office of Historic Preservation (OHP). Other sources consulted include: the *California History Plan* (CAL/OHP 1973); *California Inventory of Historic Resources* (CAL/OHP 1976); *Five Views: An Ethnic Sites Survey for California* (CAL/OHP 1988); *Archeological Determinations of Eligibility* (CAL/OHP 2008b) *Historic Civil Engineering Landmarks of San Francisco and Northern California* (American Society of Civil Engineers 1977); and, other local and regional surveys/inventories and lists (see REFERENCES CITED AND CONSULTED).

In addition, Mr. Stuart A. Guedon (M.A., Historical Geographer and Archaeologist), Basin Research Associates, secured copies of relevant 1850s maps and text regarding the locations of the Berryessa dwelling sites on January 2, 2009 at the Office of the Santa Clara County Surveyor.

Thirty-one (31) compliance reports on file with the CHRIS/NWIC include the project reaches. The CHRIS/NWIC records search was positive for recorded archaeological sites and reported cultural resources²⁹ located in and/or adjacent to the proposed project and within 0.25 miles of Reaches 1-9 and Bypass Alternatives 1 and 2. Three prehistoric sites and one reported cultural resource are mapped by the CHRIS/NWIC in/adjacent to Reaches 1-9 and one recorded Native American reburial location is mapped within 0.25 miles of the APE.

29. Reported Cultural Resources are assigned C-# by the CHRIS/NWIC.

5.1 RECORDS SEARCH RESULTS

5.1A Compliance Reports

Thirty-one (31) compliance reports include the project reaches. Three reports, all negative, include areas adjacent to the project reaches (see Attachments for CHRIS/NWIC mapping of reports).

*Proposed Berryessa Creek Channel Improvements*³⁰

Holman 1975/S-4769; Reaches 0-9

Cartier 1980/S-5304; part Reach 5

Cartier 2002/S-26216; part Reach 1

Burial recovery - Cartier et al. 1986/S-8115; part Reach 3³¹

Rosenthal 2008/S-34869;³² Reach 3/4

Channel Monitoring Reports

Pacific Legacy 2005/S-29682, Reach 7/8

Berryessa Creek Park

Steiner and Quick 1986/S-8270, part Reach 7

Parcels Adjacent/including Berryessa Creek

ACRS [Dietz and Wilson] 1987/S-4296, Reaches 1, 2, most Reach 3

Holman 1978/S-4570, part Reach 9

Old Piedmont/Brancato parcel - Holman 1980a/S-5274, Anastasio 1987/S-9192,
Harmon and Anastasio 1989/S-10880, Cartier 2003/S-27082, Reach 9

Lincoln parcel - Cartier 1983/S-6164 with testing Cartier 1983/S-6165, part
Reach 3 parcels adjacent to the triangular San Jose Water District

"Cropley Pump Station" - Holman 1974/S-4377, part Reach 7, and Bypass
Alternatives 1 and 2; Holman 1984/S-6697, part Reach 6; Cartier 1981/S-
8415, part Reach 6

City Infrastructure

Storm drain - Busby and Garaventa 1982/S-11214, part Reach 7 with Addendum
Garaventa and Ogrey 1983/S-16899, part Reach 7

Proposed Gibraltar Drive overcrossing - Cartier 1993/S-15929 with testing Cartier
1994/S-15947, Reach 3

30. Note Hylkema (2004) not on file at the CHRIS/NWIC cited in Pacific Legacy 2005/S-29682; assume at least Reach 7/8.

31. Three other Burial reports not on file: Cartier and San Filippo (1987, 1988) and Cartier et al. (1986).

32. Part relocation of railroad tracks not in the vicinity of Reaches 1-3.

Montague Expressway Improvement - HPSR - Basin Research Associates 1999/S-23356), ASR - Basin Research Associates 1999/S-23357, and HASR - Hill 1999/S-23358, Reach 3/4

South Bay Water Recycling Program

Cartier 1992/S-14230, Reaches 1-3 and part 4
 Treatment Plan - Busby et al. 1996/S-19072, part Reach 3
 Monitoring Closure Report - Busby 1999/S-23080, part Reach 3 [as mapped]
 Additional Inventory - Busby 1999/S-23105, part Reaches 2-3; Busby 2000/S-23382, crosses Reach 3

City of San Jose General Plan Review

Garaventa and Guedon 1993/S-S-15228; all Reaches

S-4296 ACRS (Dietz and Wilson 1987)

The Report of the Archaeological Reconnaissance of the Proposed South Bay Industrial Center, Santa Clara County, California (ACRS [Dietz and Wilson] 1987/S-4296) provides sections entitled Project Location, Project Description, Previous Archaeological and Historical Research (including the results of a negative records search), Investigation Method, and Investigation Results, Project Impacts Upon Archeological Resources [Direct] and Indirect Impacts Upon Archeological Resources, and Mitigation and Recommendations. The field survey reviewed both banks of Reaches 1, 2, and most of Reach 3 to north of a substation (north of Landess Avenue) including the entire creek bed and side surfaces, estimated as to a depth of approximately 10 feet in some areas. A midden deposit with fire cracked rock (FCR) and *Ostrea lurida* and *Cerithidea* shell were observed within an area of approximately 20 x 20 meter area on the west side of Berryessa Creek in the creek and access road right-of-way west to approximately 10 meters east of the Western Pacific tracks. "Little color change" was observed between the site (FCR and shell) and the surrounding light grey soil.³³ A large portion of the deposit appeared to have been destroyed by the channelization of Berryessa Creek. [The CHRIS/NWIC later assigned this site, ACRS Temporary #74.8.06/1, C-167. It is possible that this resource or a portion of this site was later recorded as CA-SCI-593 (P-43-000588) (Stradford and Cartier 1986/form). CHRIS/NWIC maps C-167 and CA-SCI-593 as separate sites].

S-4377 Holman 1974

The letter report regarding an archaeological site reconnaissance, *lands of Starlite Homes*, San Jose, California (Holman 1974/S-4377) involves a 16.1 acre project parcel situated adjacent to north side of Berryessa Creek, part of Reach 7 and the south side of Cropley Avenue including part of Bypass Alternatives 1 and 2. Most

33. A Cropley clay loam, 1 to 3 percent slopes (Cv), a dark grayish-brown moderately friable, noncalcareous, neutral clay loam surface soil to depths of 14 to 23 inches (USDA/SCS 1958:75).

of the far western part of Bypass Alternative 2 crosses this project parcel. Maps and records at the Treganza Museum were consulted prior to conducting a survey. The results were negative for recorded archaeological sites and "indicated" that a 10-foot corridor adjacent to the creek had been surveyed previously [citation not provided]. Survey results were negative.

S-4570 Holman 1978

The letter report regarding an archaeological reconnaissance of the proposed *Lands of Lo Bue* (Holman 1978/S-4570), approximately 30 acre parcel east side of Old Piedmont Road (part Reach 9), northeast San Jose includes a records search and field survey identified CA-SCI-156 (P-43-000168) to south of project along Old Piedmont Road and Copley Road. The partial survey of project area concentrated on level ground on western edge of project; northern edge of property which apparently had been quarried in recent years; and, "detailed inspection" of rock outcroppings along creek bed and banks. "No evidence of grinding holes or pecked or painted art were found along or next to the creek. Neither was there any evidence of archaeological remains found in the flat area on the western edge of the project area, nor do I fee that any will be found in a buried state at a later date."

S-4769 Holman 1975

The letter report regarding a *proposed Berryessa Creek channel improvement* from the confluence with Lower Penitencia Creek near North Main Street (Reach 0) to Old Piedmont Road (Reach 9) (Holman 1975/S-4769). The proposed improvements to the creek channel were described as "*an expansion of the present right of way as much as 80 feet at the beginning of the project, relocation of the channel in a portion of the project area, the construction of new earth levees and accompanying access roads and protective chain link fences and, I would assume, the re-grading of the trapezoidal channel itself.*" This creek was one of many surveyed in summer 1973 for the County [Santa Clara Valley Water District] with relevant pages of a Woodward-Clyde (1975) report attached [summarized below]. The maps and records were consulted at the Treganza Museum and data in the possession of Mr. and Mrs. Chester King found no additional information. The survey involved the area of direct impact and a sample of open space within the "100 year flood plain." A survey corridor of 100 feet on either side of the proposed channel from Calaveras Road to the Old Piedmont Road. Only "small sections" could be surveyed due to roads and buildings. The "100 year flood plain" survey includes open space around the existing creek channel excluded Reaches 1-3 between Calaveras Road and Landess Avenue were not surveyed due to high thick grasses; the remainder appears to have been surveyed, relying on 100-foot transect intervals. No sites were observed. Soil is described "*a uniform color and consistency, and except for one small areacompletely devoid of (or nearly so) the usual amounts of rock, both chert and other kinds, found on the surface around the Santa Clara Valley.*" Portions of Woodward-Clyde Consultants (1975) report are attached: an EIS cover page, selected Figures 6, 11, 20, 21 [Figures 20-21 include Jacklin Road to east of Old Piedmont Road], and History and Archaeology

text regarding the absence of significant historic sites, sources (National Register of Historic Places, California Historic Preservation Officer, and the Santa Clara Historical Heritage Commission), the results of the archaeological survey conducted, and discussion of project impacts, and "precautions" (mitigation section).³⁴ The survey involved *"A thorough survey of the entire modified channel alignment of Berryessa Creek, as proposed by the District, revealed no significant relics and a sampling of the 100-year flood plain of the creek downstream of the point 1500 feet above Old Piedmont Road [Reach 9] resulted in no archaeological finds, either."*

S-5274 Holman 1980

This report regarding the *Old Piedmont Property* (Holman 1980/S-5274), an approximately 40-acre parcel northeast side of Old Piedmont Road at the junction of Old Piedmont and Cropley Road, includes Reach 9. The records search and field survey of this parcel identified CA-SCI-156 (P-43-000168) on the southwest corner of Old Piedmont Road and Copley Road along the bank of Berryessa Creek and CA-SCI-157 (P-43-000169) within 0.25 miles of project. The field survey was negative but noted the surface of "all of the flat along the creek" is obscured by an old house and other structures.

S-5304 Cartier 1980

The *Archeological Evaluation of the Proposed Berryessa Creek Flood Control Project between Cropley Ave and Highway US 680* (Cartier 1980/S-5304) consists of an Abstract, Location and Description of the Subject Areas, Request for Archaeological Evaluation, Archaeological Survey, and Conclusions and Recommendations. The records search noted CA-SCI-156 and -157 (P-43-000168 and -000169) upstream of the project and field survey of 1900 foot long portion of Reach 5 between I-680 and Cropley Avenue was negative. This survey involved "four transects, one on each side of the creek bed examining each exposed bank, and one on each bank top." The "excellent" survey conditions - recent erosion along the creek bank - exposed a vertical soil profile of up to three meters showing mostly disturbed soil above the lower 3-feet/90-centimeters).

S-6164 Cartier 1983

The *Cultural Resource Evaluation of the Lands of Lincoln Property Company on Milpitas Blvd in the City of Milpitas, Santa Clara County, CA* (Cartier 1983/S-6164) involved a parcel situated between Milpitas Boulevard and Pieper Drive³⁵ and north of Landess Avenue within Reach 3 just south of PG&E Substation. This report provides an Abstract, Location and Description of the Subject Area, Request

34. Pages 3-77, 4-12, 5-6, 6-7. Page 3-77 refers to Appendix 9 responses by the California Historic Preservation Officer and the Santa Clara Historical Heritage Commission and to Appendix 10, the archaeological survey by Holman. These appendices are not attached.

35. No longer extant. Pieper Drive was on the east side of and parallel to the railroad tracks.

for Archaeological Evaluation, Archaeological Survey, and Conclusion [sic] and Recommendations. The records search identified *"An unrecorded prehistoric site" "just off the northeast corner of the project. The site, located on the west side of Berryessa Creek, between Milpitas Blvd and the Western Pacific Railroad alignment, was destroyed during the channelization of Berryessa Creek. At the time of discovery, the remains of the midden were evident on the levees of the creek channel and consisted of fire-cracked rock and shell. Some shell scatter was also noted east of the levee (A.C.R.S., n.d.) [conforms to ACRS 1987/S-4296, Temporary site #74.8.06/1, CHRIS/NWIC C-167].* The survey was negative, "The entire parcel was covered with parking lot surface or structure." Testing or archaeological monitoring was recommended.

S-6165 Cartier 1983

The *Subsurface Archeological Testing of the Lands of Lincoln Property Company on Milpitas Blvd in the City of Milpitas, Santa Clara County, CA* (Cartier 1983/S-6165) was preceded by a *Cultural Resource Evaluation*³⁶ for a 13 acre parcel located between Milpitas Boulevard and Pieper Drive which recommended testing or archaeological monitoring which identified *"An unrecorded prehistoric site" "just off the northeast corner of the project. The site, located on the west side of Berryessa Creek, between Milpitas Blvd and the Western Pacific Railroad alignment, was destroyed during the channelization of Berryessa Creek. At the time of discovery, the remains of the midden were evident on the levees of the creek channel and consisted of fire-cracked rock and shell. Some shell scatter was also noted east of the levee (A.C.R.S., n.d.) [citation also in Cartier 1983/S-6164].*³⁷ The testing report includes an Abstract, Location and Description of the Subject Area, Request for Archaeological Evaluation followed by Archival Background and Testing, Conclusion [sic] and Recommendations. The survey of project parcel was negative, likely because the surface was capped "in oiled and screened gravel and hardtop parking surfaces" (:1). The 13 trenches and 9 auger borings were negative. The thirteen (13) trenches varied from 100 to 310 cm in depth; the 9 four-inch auger borings from 40 to 130 cm. Some natural Franciscan chert gravel and cobbles were observed in Auger #1 near Milpitas Boulevard between 0-40 cm DBS.

S-6697 Holman 1984

The letter report for *Cropley Avenue Property, San Jose* (Holman 1984/S-6697) involves a less-than 10-acre triangularly shaped parcel situated on the north side of Berryessa Creek Reach 6 on the north side of west end Bypass Alternative 2 and south side of Bypass Alternative 1. The records search was negative in/adjacent to the project and noted CA-SCI-156 and -157 recorded upstream (P-43-000168 and -000169). Two previous negative surveys had included part of the proposed project:

36. Not cited: Cartier et al. 1983/S-6164.

37. Archaeological Consulting Services n.d. appears to conform to: ACRS 1987/S-4296, ACRS Temporary #74.8.06/1, CHRIS/NWIC C-167.

Holman and Cartier [not cited in report: Holman 1974/S-4377; Cartier 1981/S-8415]. In addition to lush weeds, probable fill material was observed near Cropley. No artifacts were observed within the "light brown to gray clays mixed with large amounts of rock, including water worn chert cobbles, fist sized and under, many of which were of artifactual quality."

S-8115 Cartier et al. 1986

The *Burial Recovery at Berryessa Creek in the City of Milpitas, County of Santa Clara* (Cartier et al. 1986/S-8115) within Reach 3 provides the circumstance of the discovery human remains during a field reconnaissance by the U.S. Army Corps of Engineers and the salvage of a human burial and associated prehistoric deposit at the Berryessa Creek Site, CA-SCI-593. The report describes personnel involved (archaeologists, osteologist, and Native American) and includes a research framework, field procedures, faunal and lithic descriptions/analysis, unit/level records, radiocarbon analysis (including Beta Analytic Inc. data sheet), and osteological material from Burial 1 [only]. See the description of CA-SCI-593 (P-43-000588) for additional detail.³⁸

S-8270 Steiner and Quick 1986

An Archeological Assessment of Berryessa Creek Park, City of San Jose, Santa Clara County, California (Steiner and Quick 1986/S-8270) was undertaken for proposed modifications to existing Berryessa Creek Park situated in part of Reach 7. At the time, was bounded by Berryessa Creek on the north, Messina Drive on the west, Isadora Drive on the south, and Majestic Elementary School on the east. The report provides a brief Historic Setting, Ethnographic Setting, a summary of the Records Search, results of the archaeology survey, and conclusions and recommendations. Two recorded prehistoric sites, a lithic scatter and an isolated possible stone tool were identified along Berryessa Creek approximately 0.25 and 0.5 mile upstream from the Park project [assume CA-SCI-156 (P-43-000168) and SCI-157 (P-43-000169)]. The "Thorough inspection of the site, with particular attention to the creek channel and its banks" was negative. "However, it was apparent that development of the present park, including the construction of the berm alongside the creek and turf installation, has altered or obscured most of the original ground surface."

S-8415 Cartier 1981

The *Cultural Resource Evaluation of the Day Saints Project in the City of San Jose, County of Santa Clara* (Cartier 1981/S-8415) is located on the south side of Cropley Road on the east side of Morrill Road adjacent to the north bank of

38. Cartier and San Filippo (1987) presented a paper at the Society for California Archaeological (SCA) meetings in 1987 and published their paper in 1988. The 1988 paper includes the disinterment of a second burial eroding from the west bank of the creek. See the description of CA-SCI-593 (P-43-000588) for additional detail.

Berryessa Creek Reach 6 and west side of the triangular San Jose Waterworks parcel adjacent to north side of west end Bypass Alternative 2 and south side of Bypass Alternative 1 to Morrill Avenue. Portions of this parcel include the entire Holman 1974/S-4377 and part of the Holman 1984/S-6697 parcel. The Cartier report includes an Abstract, Location and Description of the Subject Area, Request for Archaeological Evaluation, Archaeological Survey, and Conclusions and Recommendations. The records search and survey were negative. CA-SCI-156 and -157 were identified east of the project. The surface "soil consisted of tan sandy loam with gravel. The rock consisted of sandstone and natural chert."

S-9192 and S-10880 Anastasio 1987 and Harmon and Anastasio 1989

A Cultural Resources Assessment of the Lands of Brancato on Old Piedmont Road, Santa Clara County, California (Harmon and Anastasio 1989/S-10880) relies on the text and management recommendations of the earlier Anastasio (1987/S-9192) report with an updated records search for a parcel situated within Reach 9, "bounded on the west by Old Piedmont Road, on the north by San Jose city line, on the east by Berryessa Creek, and on the south by various properties." This parcel is approximately the same as Holman (1980/S-5274). The report provides a project location and description, Background (Native American and Historic Period), Archaeological Field Survey, Summary and Conclusions, and Management Recommendations. The report maps CA-SCI-156 at about midpoint along the western edge of the project [e.g., Reach 8 and east end of Bypass Alternatives 1 and 2] and CA-SCI-157 further west along Cropley Road [Bypass Alternatives 1 and 2]. In addition "four [Berryessa family] palizadas" were identified ... in a row 'along the south bank of Berryessa Creek just west of the Old Piedmont Road (Hendry and Bowman 1940:862)'.³⁹ The field survey results were negative for prehistoric and/or "clearly historic archaeological material and/or existing or potential heritage trees in/adjacent to the Berryessa Creek APE. An existing residential complex at 2052 Old Piedmont Road was present in the northwestern corner of the parcel (northwest of the Reach 9) with "remnants of a small wooden building, consisting of a few standing posts and a jumble of boards" were observed "at the southern edge of the parcel near Berryessa Creek." Subsurface testing was not recommended. Archaeological monitoring was recommended due five factors, four of which are applicable to the Berryessa Creek APE: the presence of prehistoric archaeological site [CA-SCI-156] adjacent/possible within the proposed project; "the possibility of encountering isolated Hispanic Period material associated with the Berryessa *palizadas*"; "the potential sensitivity of the geomorphic location in the Los Buellis Hills between two sources of water [Berryessa and Sweigert Creeks]; and, "limited ground surface visibility, which may have obscured more definite cultural indicators". See also the update of this report by Harmon and Anastasio (1989/S-10880).

39. Hendry and Bowman (1940:862-863, H&B #18-21), Four Berryessa Palizada Dwelling Sites, dating to the early 1830s (prior to 1833). See report text under subheading *Potential Hispanic Era Resources*.

S-11214 Busby and Garaventa 1982

A Cultural Resources Assessment of Five Storm Drains, City of San Jose, California (Busby and Garaventa 1982/S-11214) reviews five Locations, Research Sources Consulted, archival results, a brief historic overview with attention to each of the five locations, summaries of prehistoric and historic resources, and Summary/management Recommendations. A field reconnaissance of the five projects was not undertaken due to the presence of paving and/or concrete. Location Sierra Creek No. 3, situated within the existing creek channel of Berryessa Creek (part Reach 7), was to be extended ca. 500 feet west of the former boundary of Berryessa Creek Park (west of Messina Drive) by extending the existing creek channel about 5-10 feet deeper "ca. 400 feet of pipe placed east of the ditch along Melchester Drive." Two sites, CA-SCI-156 and SCI-157 were identified and mapped within 0.25s and 0.76 miles of the Sierra Creek No. 3 location. A high sensitivity/potential for possible cultural resources was identified. Intensive archaeological monitoring was recommended. See also *Addendum* (Garaventa and Ogrey 1983/S-16899).

S-14230 Cartier 1992

The *Evaluation of Archaeological Resource for the San Jose/Santa Clara Nonpotable Water Reclamation Project* (Cartier 1992/S-14230) is bounded on the east by I-680 and includes most of the City of Milpitas Reaches 1-3, and part Reach 4 as well as Cities of San Jose and Santa Clara. This report provides Environmental Background and Ethnographic Background, the results of an Archival Background including Description of Archaeological Sites Which May be Impacted, including CA-SCI-593 (P-43-000588) and C-167 in the Reclamation Project East Zone and the results of a Surface Reconnaissance which noted "Exposed dark brown silty midden was visible in the creek bank" just north of Montague Expressway which appears to conform to CA-SCI-593 [:22 site number not stated]. The Recorded Sites in the Field Survey Alignments (:27) reviews both CA-SCI-593 and C-167. CA-SCI-593 surface visibility was "hampered by fill and gravel" with very good visibility along the creek "with little vegetation and exposed midden. Milpitas Boulevard, channelized Berryessa creek, and railroad tracks "intersect the site"; a modified Franciscan chert flake and cobbles, fire-cracked rock, *Cerithidea* and oyster shell fragments, and mammal bones (possibly human) were observed along the creek bank. C-167 was covered by an industrial building and parking lot with poor visibility due to the parking lot and landscaping. No cultural material was observed. The Conclusions and Mitigations :29 concluded that CA-SCI-593 would be impacted on the west side by a 12-inch pipeline and recommended final design review, archaeological monitoring, and salvage recovery. C-167 would be impacted on the east side by a 12-inch pipeline. Recommendations for C-167 were limited to final design review and archaeological monitoring.

S-15228 Garaventa and Guedon 1993

Cultural Resources Review for the City of San Jose 2020 General Plan Update (Garaventa and Guedon 1993/S-15228) shows part of Reaches 5 to Reach 9 on the 1980 USGS Calaveras Reservoir, Calif. topographic quadrangle within an area of sensitivity for archaeological resources. The APE for Reach 0 to a portion of Reach 5 is not shown as sensitive for archaeological resources.

S-15929 Cartier 1993

The *Cultural Resource Evaluation of the Milpitas Boulevard Overcrossing Project Located in the City of Milpitas, County of Santa Clara* (Cartier 1993/S-15929) involves a proposed overcrossing over Berryessa Creek just east of Milpitas Boulevard on Gibraltar Drive⁴⁰ within Reach 3. This report provides an Abstract, Request for Archaeological Evaluation, Qualifications of Archaeological Resource Management, Location and Description of the Subject Area, Methodology (archival search, surface reconnaissance, and written report), Archival Background, Surface Reconnaissance, and Conclusions and Recommendations. "Small amounts of prehistoric cultural materials were found within the subject area; probably relating to CA-SCI-593" which is characterized as a "large midden deposit with burials" identified next to the project and relocated 100 yards upstream from the proposed project. The overcrossing area finds consisted of small amounts of prehistoric cultural material (fire-cracked rock and *Cerithidia* shell). Cartier states that "CA-SCI-593, or the Berryessa Site, was first detected by Deetz [*sic*] (Dietz and Wilson) (C-167), later recorded by Stradford and Cartier (1986), and subject to a salvage excavation of human burial (female, 18-20 years of age, radiocarbon date of 1660 \pm 80 B.P.) and associated prehistoric deposit as a result of a field reconnaissance by the U.S. Army Corps of Engineers. Nonetheless, the site is mapped south of the proposed project [Note: as mapped by the CHRIS/NWIC, the project appears to include part of C-167 (e.g., CHRIS/NWIC File No. 08-0825)]. Recommendations consisted of one hand excavated unit and eight (8) auger units to define the prehistoric deposit along with archaeological monitoring during construction.

S-15947 Cartier 1994

The report for the *Archaeological Testing Milpitas Boulevard Overcrossing Project Located in the City of Milpitas, County of Santa Clara* (Cartier 1994/S-15947) incorporates some of the information in his *Cultural Resource Evaluation* (Cartier 1993/S-15929) and also includes Environmental Setting, Ethnographic Background, Archival Background, Field Method, Testing Results, and Conclusions And Recommendations. One 1 x 1 meter hand excavated unit was located on the east side of Berryessa Creek within the proposed bridge footprint. Eight auger units were dispersed, four on each side of the creek and north/south of the proposed bridge. The 1 x 1 meter unit exposed a dark brown silty loam changing to a medium brown sterile soil at approximately 90 cm with shell (marine

40. This overcrossing was not built; Gibraltar Drive terminates on the west side of Milpitas Boulevard.

and land), fire-cracked rock, bone, debitage, baked clay, and historic metals (2; wire in 0-20 cm and an expended cartridge in 40-60 cm). A single Franciscan chert thinning flake was recovered from 20-40 cm. Shell was found from Level 0-20 cm to 80-100 cm and rodent bone at 0-20 cm, 40-60 cm and a small mammal vertebrae at 60-80 cm. No cultural material was present in Auger Units 1-4 on the west side of the creek or Unit 8 on the east side of the creek. A single *Cerithidea* shell was recovered from Unit 5 at 20 cm, and Units 6-7 at 40 cm on the east side of the creek. These finds were interpreted as a "related to" CA-SCI-593.

S-16899 Garaventa and Ogrey 1983

The *Addendum* (Garaventa and Ogrey 1983/S-16899) to *A Cultural Resources Assessment of Five Storm Drains, City of San Jose, California* (Busby and Garaventa 1982/S-11214) reviews the placement of a proposed replacement of a pedestrian bridge (footings), sidewalks, and cul-de-sac street improvement necessitated by the construction of the proposed bridge over Messina Drive within Reach 7. The recommendations in the 1982 report were deemed appropriate.

S-19072 Busby et al. 1996

The *Historic Properties Treatment Plan South Bay Water Recycling Program* (Busby et al. 1996/S-19072) in the Cities of Milpitas, San Jose, and Santa Clara provides a Summary Of Previous Work in the Project Area, an Historic Properties Review (Recorded and Non-recorded sites, and Impacts to Potential National Register Properties), an Archaeological Data Recovery Plan (ADRP), Field Methods and Analytical Strategies, Effect to Historic Properties with an Historic Property Monitoring and Protection Plan (HPMPP), Monitoring and Historic Property(ies) Protection Plan (MHPPP), Reports and Dissemination of Results, and Curation. This extensive pipeline project includes part of Reach 3.

The *Monitoring Closure Report* regarding the *South Bay Water Recycling Program - Cultural Resources Program* (Busby 1999/S-23080) noted no resources in or near the portion of the extensive pipeline project which included part of Reach 3.

S-23105 Busby 1999

This report regarding *Historic Properties Affected or Potentially Affected by the South Bay Water Recycling Program "Package 1" Segments SC 1, SC 3, SC 5, M 2, M 3, M 4, M 5 and SJ/C 1, Cities of Milpitas, San Jose, Santa Clara, and Sunnyvale, Santa Clara County* (Busby 1999/S-23105) includes portions of Reaches 2-3 and provides Research Sources Consulted, Project Specific Reports and Program Activities, Significance Criteria, Historic Properties Identified (Native American, Ethnographic, Hispanic Era, American Period), Summary of Historic Properties In/Adjacent/Near by segment, and Recommendations. This report includes part of Reaches 2-3 with C-167 and CA-SCI-593 (P-43-000588) identified as south of Segment M 4, "[Milpitas] Town Center", south of the pipeline which

would proceed along Milpitas Boulevard and Gibraltar Avenue to the west side of Berryessa Creek, Reach 3.

S-23356, S-23357, and S-23358 Basin Research Associates 1999

The *Historic Property Survey Report* [HPSR] (Basin Research Associates 1999/S-23356), *Archaeological Survey Report* [ASR] (*Positive*) (Basin Research Associates 1999/S-23357), and *Historic Architectural Survey Report* [HASR] (*Abbreviated*) (Hill 1999/S-23358) for the *Montague Expressway Improvement Project, Cities of Santa Clara, San Jose, and Milpitas, Santa Clara County, California* cross Reaches 3 and 4 along the Montague Expressway. The HPSR contains Summary of Findings, Project Location and Description, Resume of Survey, Public Participation and Coordination, Resources Identified, Documentation to Support Conclusion of No Effect, Informal Agency View, and Conclusions. The ASR provides An Introduction and Summary of Findings, Project Location and Description, Research Sources Consulted and Results, Background Review, Field Methods and Survey, Findings, and Conclusions. The HASR is limited to a Summary of Findings. No historic properties were identified within the Archaeological or Architectural Areas of Potential Effect in or adjacent to Reaches 3 and 4. Berryessa Creek Bridge No. 37C-127 was built in 1968 and evaluated as a Category "5," not eligible for the National Register of Historic Places.

S-23382 Basin Research Associates 2000

The *Cultural Resources Assessment (Positive) Historic Properties Affected or Potentially Affected by the South Bay Water Recycling Program Phase 2 Facilities Modifications to Existing Projects SJ-1, SJ-2, SC-5, M-1 and New Segments SJ-3, SJ-4, SJ-5, SJ-6, SJ-7, M-2, M-5, Cities of San Jose and Milpitas, Santa Clara County* (Basin Research Associates 2000/S-23382) provides Previous South Bay Water Recycling Program Reports, Research Sources Consulted, Historic and Archaeological Resources - Summary Context (Native American, Hispanic Period, American Period), Summary of Historic Properties In/Adjacent/Near by segment, Evaluation of Environmental Impacts to Historic and Archaeological Resources, and Segment Recommendations. No recorded or reported sites were identified in/adjacent to Segment M-1 Eastern Milpitas which crosses Reach 3/Berryessa Creek along Yosemite Drive.

S-26216 Cartier 2002

The *Cultural Resource Evaluation of the Berryessa Creek Levee Project in the City of Milpitas, County of Santa Clara* (Cartier 2002/S-26216) reviews a 1.7 mile portion of Berryessa Creek, mostly Reach 0, from the south side of Calaveras Boulevard north (Reach 1). The report includes an Abstract, Request for Archaeological Evaluation, Qualifications of Archaeological Resource Management, Location and Description of the Subject Area, Methodology (California Register Criteria, National Register Criteria), Ethnographic

Background, Historical Background, Archival Background, Surface Reconnaissance, and Conclusions and Recommendations. The segment including Calaveras Boulevard and northern extent of Reach 1 to North Hillview Drive is described as less than 1000 feet long and approximately 160 feet wide with a single levee and road on each side of the creek channel. Results were negative.

S-27082 Cartier 2003

The *Cultural Resource Evaluation of Lands of Brancato on Old Piedmont Road, City of San Jose* (Cartier 2003/S-27082) reviews an approximately 4.5 acre project located in Reach 9 on the east side of Old Piedmont Road which differs slightly from the configuration reviewed previously by Holman (1980/S-5274), Anastasio (1987/S-9192), and Harmon and Anastasio (1989/S-10880). This report provides an Abstract, Request for Archaeological Evaluation, Qualifications of Archaeological Resource Management, Location and Description of the Subject Area, Methodology Archival Background, Surface Reconnaissance, and Conclusions and Recommendations. CA-SCI-156, a "flake scatter" was identified as across Piedmont Road. The survey was negative for prehistoric resources with a ca. 1920-1930 Spanish Revival style residences and other structures dating between 1920-1960 present. A trench east and south of Berryessa Creek was examined revealing an upper layer of dark clay rick loam with lower layers of orange-brown clay with streaks or calcium carbonate. Rock included sandstone and conglomerate and igneous rock in gravels, cobbles, and bedrock.

S-29682 Pacific Legacy 2005

The *Archaeological Monitoring Report for the 2004 Santa Clara Valley Stream Maintenance Project* (Pacific Legacy 2005/S-29682) for the Santa Clara Valley Water District (SCVWD) identified Berryessa Creek at Piedmont Avenue, the interface of Reaches 7/8, as a potentially archaeological sensitive location. The report provides a Management Summary, Introduction, Project Description, Monitoring Results, and Conclusions which were negative. In the case of Berryessa Creek at Piedmont Avenue, large quantities of colluvial sediment during winter "must be removed periodically to minimize the possibility of flooding" (Jae Lee, SCVWD). The August 4-5, 2004 monitoring had been recommended due to the proximity of CA-SCI-159 [sic] (P-43-000171) and CA-SCI-156 (P-43-000168). In addition, a disarticulated Native American long bone had been reported within the sediments during previous excavations in the general area (Jae Lee, SCVWD).⁴¹ Impacts consisted of the removal of part of the creek bank for equipment access and the excavation and removal of soils within the creek bed. A bulldozer removed approximately 4-5 feet of sediment in increments of 10-12 inches until the original creek bed was exposed. Trucks were used to haul the soils excavated off site. The top layer (approximately 12 inches deep) "consisted of

41. Probably the P-43-001136 find which was reburied on the east side of Berreyesa Creek opposite a residence at 3327 Park Haven Court (west of Piedmont Road).

small to medium size rocks mixed with light gray sand, roots, and some modern household refuse." The very homogeneous layer below was "a mass of light gray gravel, mixed with light brown sandy clay, light brownish gray sand, and very coarse granular structures." "Several faunal bones were found at 4 to 5 feet deep. In addition, several pieces of unmodified chert, brick fragments, small pieces of wood, and a handful of glass fragments were also noted."⁴²

S-34869 Rosenthal 2008

The *Archaeological Survey and Geoarchaeological Trenching for the Freight Railroad Relocation and Lower Berryessa Creek Project in the Cities of Fremont and Milpitas, California* (Rosenthal 2008/S-34869) includes a shared project between the Valley Transportation Agency and SCVWD located at the Reach 3 and 4 interface at Landess Avenue. This report was negative with "little potential to impact significant archaeological resources." The report provides a Summary of Findings, Introduction, Project Location and Description, Natural and Cultural Background, Records Searches and Archival Research, The Issue of Buried Archaeological Sites in the Santa Clara Valley, Native American Consultation, Field Inventory and Findings [limited to areas not previously surveyed], Geoarchaeological Exploration and Findings, Summary and Conclusions. Berryessa Creek is among the "watercourses" described as "contained in artificial channels and do not follow their historical alignments."

5.1B Sites and/or Reported Cultural Resources In/Adjacent

Three prehistoric sites and one reported cultural resource are mapped by the CHRIS/NWIC in/adjacent to Reaches 1-9 (see Attachments).

CA-SCI-156 (P-43-000168), a "flake scatter" - a single flake and two shells with some possible fire-affected rock; part of Reaches 7-8 (see Attachments, Form 1).

CA-SCI-157 (P-43-000169) an "open ? artifact [not described]; as mapped by the CHRIS/NWIC as adjacent to Bypass Alternatives 1 and 2, but as described. Comment: this artifact should have been recorded as an isolate rather than as a site (see Attachments, Form 2).

CA-SCI-593 (P-43-000588), a prehistoric site with Native American burials; Reach 3 (see Attachments, Form 3 + supplemental materials).

C-167, a Reported (but unrecorded) Cultural Resource, possible midden excavated from CA-SCI-593 (P-43-000588) and redeposited; Reach 3. Comment: Cartier (1993:3/S-15929), states that "CA-SCI-593, or the Berryessa Site, was first detected by Deetz [*sic*] (Dietz and Wilson) (C-167), who identified the site as a midden

42. This report cites Hylkema (2004) *Archaeological Survey Report [ASR] for the Proposed 2004 Stream Maintenance Program: Thirty-one Locations within Santa Clara County, California* which is not on file, L. Hagel, CHRIS/NWIC, personal communication, 2/27/2009).

deposit marked by fire cracked rock and shell scatter, and located on the west side of Berryessa Creek" (see Attachments, Card 1).

Site Summary

CA-SCI-156 (P-43-000168) is a "flake scatter" described as a single flake and two shells with some possible fire-affected rock recorded adjacent to Berryessa Creek at the junction of Old Piedmont and Cropley Roads (part of Reaches 7-8) (Bergthold 1974/form).

Comment: Cultural material could have been deposited/removed from this recorded archaeological site location by periodic flooding of Berryessa Creeks; the construction of Old Piedmont Road and/or Cropley Road; and/or, the existing residential complex and the San Jose Water Works tanks.

National Register Status: CA-SCI-156 (P-43-000168) does not appear on the *Archeological Determinations of Eligibility* list for Santa Clara County (CAL/OHP 2008b). In the opinion of Basin Research Associates, the site does not appear to satisfy National Register criteria, including integrity of location and/or (d) ". . . have yielded, or may be likely to yield, information important in prehistory or history."

CA-SCI-157 (P-43-000169) consists of an "open ? artifact found on fill material from [a] nearby tract house development 150 yards west of Berryessa Creek" located on an "open field near existing Cropley Road 1/3 mile southwest of Piedmont Road on exotic fill" (Anderson 1974/form). NOTE as mapped by the CHRIS/NWIC, this site is located adjacent to the south side of Cropley Road, Bypass Alternatives 1 and 2.

National Register Status: Not applicable; not listed on *Archeological Determinations of Eligibility* list for Santa Clara County (CAL/OHP 2008b). In the opinion of Basin Research Associates, the site - an isolate - does not appear to satisfy National Register criteria, including integrity of location and/or (d) ". . . have yielded, or may be likely to yield, information important in prehistory or history."

CA-SCI-593 (P-43-000588), a prehistoric deposit with human remains was observed in April 1986 eroding from the west bank of channelized Berryessa Creek, east of Milpitas Boulevard opposite the PG&E Substation in the City of Milpitas.⁴³ The U.S. Army Corps of Engineers (USCOE) contacted Santa Clara Valley Water District about the find. Archeological Resource Management (ARM) was engaged to investigate and excavate. As mapped, the site extended from just north of a driveway on the north side of a PG&E substation to about parallel with the southern of the substation building within Reach 3. The approximately 80 meter long x 60 meter wide deposit was visible within the creek bank, on the levee, both sides of Berryessa Creek and continued east approximately 40 meters east crossing a nearby

43. Opposite a PG&E Substation located at on the east side of Milpitas Boulevard north of the Montague Expressway and south of Ames Avenue.

railroad bed.⁴⁴ The partially exposed Burial #1 was located on east bank between 130-150 cm below surface within an area of 230 x 70 cm excavated in two levels: a disturbed overburden 0-50 cm (e.g., nail, plastic bottle cap) and an intact 50-70 cm level. The slightly larger area of 230 x 80 cm was excavated in five 20 cm levels to 150 cm deep. "all pedestal soil was wet screened in Berryessa Creek using 1/16 inch mesh". In addition a single test unit was excavated the following month (May) east of Burial #1, about midpoint between the creek and railroad tracks. Midden was noted to a depth of approximately 160 cm. deep with a "distinct gravel feature with alluvial soil ... in the creek embankment below the cultural deposit" (Cartier and San Filippo 1988).

Finds from CA-SCI-593 have been limited and consist of mostly fire cracked rock, with hearth features "suspected ... based on frequency of FCR" [fire-cracked rock]. Burial #1 consisted of semi-flexed partial skeleton of a young female, 18-20 years of age, facing east, oriented north-south, head north (Stradford and Cartier 1986/form). A left femur of a Southern sea otter (*Enhydra lutris*) was found during the survey conducted prior to during the disinterment of Burial #1. The vertebrate assemblage recovered with Burial #1 appeared to be an intrusive historic deposit although three bones were burnt with one fragment "highly polished with multiple sets of parallel striae" and likely part of a bone tool. The invertebrate fauna with Burial #1 consisted of mostly *Cerithidea* sp., with *Ostrea* sp. (27%) and Bent Nose clam (8%) along with crab claw fragments (1.6%) and likely historic era land snail shell (0.4%).⁴⁵ The lithic assemblage was limited to a single quartzite waste flake and Franciscan chert: 3 angular waste, 10 waste flakes, a utilized flake with edge-damage, a uniface - cortical flake with possible retouch for use as a drill, and a steeply retouched uniface, possibly a scraper. In addition to numerous sandstone cobbles and cobble fragments (mostly FCR), a small elongated pestle fragment and rough, basalt cobble fragment (possibly used as a mano) were recovered. Fire cracked rock was recovered from subsequent intact levels.

Burial #2,⁴⁶ the skeletal remains of young child of undetermined sex, was found in July 1986 eroding from the west bank of Berryessa Creek, north of Burial #1, at the bottom of the midden deposit. The screened midden had large amounts of shellfish (*Cerithidea*, oyster, bent-nose clam), a small amount of chert waste chips, and a broken charmstone.

Radiometric dates of 1320 ± 70 B.P.⁴⁷ and 1660 ± 80 B.P.⁴⁸ suggest that CA-SCI-593 was a habitation site dating to between 1300 B.P. - 1700 B.P., Late Phase of the

44. Note the site configuration and location on the site form (Stradford and Cartier 1986) differs from the "large dot" location on Fig. 2 of the 1988 SCA article by Cartier and San Filippo (1988:312) as well as the sketch map (USCOE 2006). The USGS map with the site form and sketch map indicate the site is located west of the transmission line and likely extends under Milpitas Boulevard.

45. The site form also notes mussel.

46. Burial position, orientation, etc. not provided.

47. 1320 ± 70 B.P.: 41 grams of *Cerithidea*, Beta-16577 Unit 2, 20-30 cm. [unit location unknown].

Middle Period. This relatively short occupation - approximately 340 years - is attributed to flooding causing river/creek realignment and settlement relocation (Stradford and Cartier 1986/form; Beta Analytic 1986a-b; Cartier et al. 1986/S-8115; Cartier and San Filippo 1987, 1988; USCOE 2006).

Alluvial deposits were observed below and possibly above CA-SCI-593 and at many prehistoric habitation sites in the vicinity of the Guadalupe River and Coyote Creek. Most of these sites date to the Middle Horizon, all contain human burials, and many are buried under alluvial deposits. Cartier and San Filippo (1988:311, 314) also note repeated abandonment and resettlement with a ". . . general pattern of settlement relocation at this time in the lower elevations of the valley." In addition, seasonal occupation - excluding winter - has been posited due to both flooding and poorly drained soils (e.g., Anastasio 1988).

Cartier (1993/S-15929) relocated CA-SCI-593 noting small amounts of prehistoric cultural material (fire-cracked rock and *Cerithidea* shell) 100 yards upstream from the proposed Milpitas Boulevard Overcrossing Project. Testing conducted north and south of Gibraltar Drive just east of Milpitas Boulevard on either side of the creek. In addition a 1994 survey and limited testing, one 1 x 1 meter hand excavated unit and eight (8) auger units, for a proposed overcrossing on Gibraltar Drive just east of Milpitas Boulevard found "traces of prehistoric cultural resources" on the east bank of the creek. These limited finds were attributed to CA-SCI-593 (Cartier 1994/S-15947).

A survey conducted in February 1992 by Cartier (1992:19/S-14230) relocated CA-SCI-593, described as impacted by Milpitas Boulevard, channelized Berryessa creek, and railroad tracks which "intersect the site." At the time, surface visibility was "hampered by fill and gravel" with very good visibility along the creek "with little vegetation and exposed midden. A modified Franciscan chert flake and cobbles, fire-cracked rock, *Cerithidea* and oyster shell fragments, and mammal bones (possibly human?) were observed along the creek bank.

Comment: Historic maps indicate that CA-SCI-593 (P-43-000588) was located about 0.6 miles north of Berryessa Creek on the eastern periphery of trees west of a marshy area (Day 1850-1851). Prior to the channelization of Reaches 1-3 between 1942 and 1961 (e.g., through CA-SCI-593), Berryessa Creek flowed into Penitencia Creek at about Capitol Expressway (US War Dept 1943; USGS 1961).

National Register Status: CA-SCI-593 (P-43-000588) is not listed on *Archeological Determinations of Eligibility* list for Santa Clara County (CAL/OHP 2008b). This site appears eligible for inclusion on the National Register of Historic Places under criterion d.

48. 1660 \pm 80 B.P.: 22 grams of *Cerithidea*, Beta-16147 Cat #102, 110-130 cm not burial unit, presumably intact midden.

C-167, a midden deposit which could be part of or from CA-SCI-593 (P-43-000588), was observed in 1987 northwest of CA-SCI-593 in the creek and access road right-of-way and approximately 10 meters east of the Western Pacific tracks [spur line] in Reach 3. Fire cracked rock (FCR) and *Ostrea lurida* and *Cerithidea* shell were noted within an approximately 20 x 20 meter area. In contrast to CA-SCI-593, little difference was observed in soils color - a light grey soil with the FCR and shell with the surrounding ambient soil⁴⁹ (ACRS) 1987/S-4296; Dietz and Wilson 1987/card). Evidence of C-167 was observed in the elevated access road along either side of Berryessa Creek which appear to have been constructed with soils excavated to form the existing creek channel. A large portion of the deposit appeared to have been destroyed by the channelization of Berryessa Creek.

Cartier (1992:19/S-14230) locates C-167 along Berryessa Creek at Milpitas Boulevard (op cit:27) and notes that C-167 was covered by an industrial building and parking lot with poor visibility due to the parking lot and landscaping. No cultural material was observed.

5.1C Sites and/or Reported Cultural Resources within 0.25 miles

One recorded Native American reburial location is mapped within 0.25 miles of the alignment.

P-43-001136, Berryessa Creek Reburial location (human femur); Reach 7 (see Attachments, Form 4).

Site Summary

P-43-001136, Berryessa Creek Reburial site - single human femur -is situated on property on the east side of Berryessa Creek Reach 7 owned by the Santa Clara Valley Water District (SCVWD), opposite a residence at 3327 Park Haven Court (east of Minto Drive and west of Piedmont Road). This single human femur appears to have been exposed during archaeological monitoring of construction by the Santa Clara Valley Water District on November 3, 1998 and re-interred [*sic*] on January 21, 1999. The 12-inch auger hole to a depth of 6 feet was placed 30 feet east of a double trunk oak tree and 48 feet northwest of a double 4x4 redwood fence post (Cartier and Kobza 1999/form).

The original location of the find is not stated on the P-43-001136 form. The Report of Archaeological Isolate indicates the femur was recovered during sediment removal from the middle of the Berryessa Creek channel between Calaveras Road and the aqueduct to the north. The Primary Record find date of November 3 disagrees with the Isolate report date of November 17, 1999 (Cartier 1998 attached to Cartier 2002/S-26216). In summary, the Native American femur appears to have been found in Reach 0 in early November 1998 and interred within the east side of

49. A Cropley clay loam, 1 to 3 percent slopes (Cv), a dark grayish-brown moderately friable, noncalcareous, neutral clay loam surface soil to depths of 14 to 23 inches (USDA/SCS 1958:75).

Reach 7 in January 1999 on property owned by the SCVWD north of Berryessa Creek Park on January 21, 1999.

5.1D Other Cultural, Traditional, and/or Contemporary Resources

The NAHC search was negative for Native American resources in or adjacent to the project APE (Pilas-Treadway 2009).⁵⁰

5.1E Listed Historic Properties

No known city, state and/or federal historically or architecturally significant structures, landmarks or points of interest have been identified in/adjacent to the AEP.

6.0 INDIVIDUALS, GROUP AND AGENCY PARTICIPATION

The Native American Heritage Commission (NAHC) was contacted for a search of the *Sacred Lands Inventory* (Busby 2009). The NAHC response was negative; the names of nine Native American individuals/organizations who may have knowledge of cultural resources in the project area were provided (Pilas-Treadway 2009). These individuals were not contacted⁵¹ (see Attachments).

No other local historical societies, planning departments, etc. were contacted regarding landmarks, potential historic sites or structures in or adjacent to the project.

7.0 ARCHAEOLOGICAL FIELD INVENTORY

7.1 PREVIOUS FIELDWORK

The entire Reach 1-9 alignment has not been previously surveyed in spite of the various proposed Berryessa Creek channel improvement projects as well as other projects crossing/in/including/adjacent to Berryessa Creek including the Montague Expressway Improvement Project, the South Bay Water Recycling Program, and Berryessa Creek Park. A number of the archaeological compliance reports refer to CA-SCI-156 (P-43-000168), CA-SCI-157 (P-43-000169), CA-SCI-593 (P-43-000588), and C-167.

Archaeological testing has been limited to the vicinity of C-167 and CA-SCI-593 (P-43-000588) in Reach 3 with negative results for a 13-acre parcel located between Milpitas

50. Negative in spite of human remains previously reported within prehistoric site CA-SCI-593 (P-43-000588) by Stradford and Cartier (1986/form).

51. Jakki Kehl, Patterson;
Valentin Lopez, Amah Mutsun Tribal Band, Sacramento;
Edward Ketchum, Amah Mutsun Tribal Band, Davis;
Irene Zwierlein, Amah/Mutsun Tribal Band, Woodside;
Jean-Marie Feyling, Amah/Mutsun Tribal Band, Redding;
Ann Marie Sayers, Indian Canyon Mutsun Band of Costanoan, Hollister;
Rosemary Cambra, Muwekma Ohlone Tribe of the SF Bay Area, Milpitas;
Andrew Galvan, The Ohlone Indian Tribe, Fremont; and,
Ramona Garibay, Trina Marine Ruano Family, Lathrop.

Boulevard and Pieper Drive just south of a PG&E substation (Cartier 1983/S-6165) and for a proposed overcrossing on Gibraltar Drive just east of Milpitas Boulevard (Cartier 1994/S-15947).

A human femur was exposed during archaeological monitoring of construction for the Santa Clara Valley Water District (SCVWD) in the middle of the Berryessa Creek channel between Calaveras Road and the aqueduct to the north (Reach 0) on November 3, 1998. This leg bone was reinterred on January 21, 1999 within SCVWD property on the side of east of Berryessa Creek opposite a residence at 3327 Park Haven Court (west of Piedmont Road) in Reach 7 (north of Berryessa Creek Park). This location has been recorded as P-43-001136 (Cartier and Kobza 1999/form).

7.2 PROJECT FIELD INVENTORY

A systematic archaeological field survey of Reaches 1-9 and Bypass Alternatives 1 and 2 was conducted by Mr. Christopher Canzonieri (M.A., Physical Anthropologist and Archaeologist), and Ms. Johanna E. Twigg (M.S., Archaeologist) on January 13-14, 2009. Mr. Canzonieri also field rechecked the vicinity of CA-SCI-156 (P-43-000168), a site recorded adjacent to the proposed project, on January 26, 2009. The Bypass Alternative 1 was limited to windshield survey along Cropley Avenue. Lacking access, Bypass Alternative 2 also included a limited viewing of the westernmost segment from Reach 6 to Cropley Avenue.

A supplemental field inventory of CA-SCI-156 (P-43-000588) was undertaken by Mr. Canzonieri on January 26, 2009.

In general, the project alignment is bordered by light industrial, commercial, and residential buildings, landscaping and paved areas along with a park, Berryessa Creek Park.

7.2A Survey Methodology

The pedestrian field survey included both sides of the creek bank and, when possible, the creek channel. The creek was dry in several areas allowing additional inspection of portions of the banks. Most survey transects were spaced 2-5 meters apart parallel to the creek. Portions of the creek are channelized with poured in-place concrete walls or Sackcrete slope protection present. Surface visibility ranged from 0-30% to 75-90%.

The width of the project alignment surveyed from the top of creek banks was constrained by existing built-environment features. As a result, the survey corridor varied from approximately 10 feet (3 meters) (e.g., Reach 4) due to fencing to as much as approximately 177 feet (54 meters) on the east side of the creek to the railroad (e.g., Reach 3 vicinity of CA-SCI-593 (P-43-000588).

7.2B Reaches 1 to 9 [Figs. 6 to 50]

Reach 1 - Calaveras Boulevard to Los Coches Bridge [Figs. 6-10]

Mr. Canzonieri walked the west bank while Ms. Twigg was on the bank of Berryessa Creek proceeding north to south parallel to the creek. Survey transects were spaced 2-5 meters apart parallel to the creek. An approximately 25-45 foot wide gravel access road parallels each side of the creek. Surface visibility along the creek banks was poor less than 20% due to dense vegetation, mostly grasses. Water was present in creek at the time of the survey. A 12-inch corrugated steel pipe outfall encased in concrete with Sackcrete “sandbags” is present approximately 345 feet (105 meters) south of Calaveras Boulevard. A 24-inch corrugated steel pipe outfall encased in concrete and reinforced with Sackcrete and large granite boulders (rip-rap) are present along the east bank approximately 355 feet (108 meters) south of Calaveras Boulevard. In addition, remnants of a possible pedestrian/bike bridge foundation are present on both banks, approximately 377 feet (115 meters) south of Calaveras Boulevard. These foundations, approximately 5 feet long x 2 feet wide x 2 feet thick, have steel plates bolted to them which have been cut with a torch.

Note: East of the APE, Los Coches Creek flows through about the middle of a residential area bounded by Cameron Circle.

Reach 2 - Los Coches Bridge to Piedmont Creek [Figs. 6, 11-16]

Mr. Canzonieri walked the west bank while Ms. Twigg walked the east bank of the creek proceeding south. Survey transects were spaced 2-5 meters apart and extended as far as approximately 45 feet (13 meters) from the top of the east bank of Berryessa Creek to the railroad tracks. Surface visibility along the creek banks was poor, less than 20% due to dense vegetation, mostly grasses. Water was present in creek at the time of the survey. An approximately 25-50 foot wide gravel access road⁵² parallels each side of the creek. In addition, an approximately 560-foot long paved trail with landscaping is present immediately south of Los Coches Bridge along the east bank of the creek opposite a residential area (Cameron Circle). Three 24-inch outfall pipes are present along the east bank of the creek. The first pipe is located approximately 440 feet (134 meters) south of Los Coches Bridge. This 24-inch RCP pipe is encased in concrete and surrounded by large granitic rock (rip-rap). The second pipe is located approximately 567 feet (173 meters) south of Los Coches Bridge. This 24-inch corrugated steel pipe is encased in concrete and reinforced with Sackcrete. The third pipe is located approximately 1,600 feet (488 meters) south of Los Coches Bridge. This 24-inch corrugated steel pipe is encased in concrete and surrounded by large granitic rock (rip-rap). In addition to several sanitary sewer manholes along the east bank along the railroad right-of-way along/near the east side of the APE, there are metering wells on both sides of the creek.

52. The variation of 25 to 50 foot wide in Reach 2 is slightly wider than Reach 1 25 to 45 foot wide.

Reach 3 - Piedmont Creek to Montague Expressway [Figs. 6, 14-26]

Mr. Canzonieri walked the west bank, while Ms. Twigg walked the east bank. Survey transects were spaced 2-5 meters apart parallel to the creek and varied from approximately 56 feet (17 meters) to a maximum of 177 feet (54 meters) from Ames Avenue south to the Montague Expressway on the railroad/east side of the creek. An approximately 25-45 foot wide gravel access road parallels each side of the creek. Surface visibility along the creek banks from Piedmont Creek south to Ames Avenue was poor less than 20% due to dense vegetation, mostly grasses. Water was present in creek at the time of the survey. A railroad trestle (bridge) spans Piedmont Creek - the division between Reaches 2 and 3. This wood girder type railroad trestle is 35 feet long by 16 feet wide including approximately 5 feet of ballast rock on either side of the tracks. Two of the various stamps on the side of the railroad tracks in Reach 3 appear to relate to specific dates and places of manufacture "10025 R.E.O.H. COLORADO 1937" and "10025 RE-OH TENNESSE-USA-1938-11". A 12-inch diameter outfall pipe (material type unknown) encased in concrete and reinforced with Sackcrete is located immediately south of Yosemite Avenue on the west bank. Several sanitary sewer manholes are present along the east bank along the railroad right-of-way and observation metering wells are present on both sides of the creek.

The creek from Ames Avenue south to Montague Expressway in Reach 3 is nearly dry and creek banks less vegetated than Reach 3 north of Ames Avenue. Overall surface visibility along the creek ranged from 0 to 100% (e.g., exposed creek bed). Mr. Canzonieri walked the creek in this area inspecting the banks for the presence of cultural materials and, especially evidence of recorded prehistoric site CA-SCI-593 (P-43-000588). This segment includes a contemporary or at least, recently upgraded train trestle built of concrete and steel sheet located approximately 463 feet (143 meters) south of the Ames Avenue Bridge. A second trestle/bridge [wood girder type] similar to the one in Reach 2/3 at Piedmont Creek is located approximately 2,357 feet (718 meters) south of Ames Avenue Bridge or 423 feet (128 meters) north of Montague Expressway.

CA-SCI-593 (P-43-000588) was relocated and for the most part conforms to the boundaries of Stradford and Cartier (1986/form) [see Attachments, Form 3]. *Cerithidea* sp. and chert were observed approximately 60 feet (18 meters) north of the current site boundaries. Evidence of the site is most visible along the railroad tracks with erosion from the top and side east bank [see Figs. 23-26]. The site was not observed on the west bank, which has been rip-rapped.

Reported Cultural Resource C-167, described as a midden deposit which could be part of or a redeposit from CA-SCI-593 (P-43-000588) was not relocated during the survey. C-167 should have been present northwest of CA-SCI-593 in the creek and access road right-of-way and approximately 10 meters east of the Western Pacific tracks [spur line]. As noted previously, the approximately 20 x 20 meter deposit exhibited little difference in soil color between the surrounding ambient soil and light grey soil with fire cracked rock (FCR) and *Ostrea lurida* and *Cerithidea* shell (ACRS) 1987/S-4296; Dietz and Wilson 1987/card).

*Reach 4 - Montague Expressway to I-680*⁵³ [Figs. 6, 27-30]

Due to the stepped shape of *Reach 4* the field reconnaissance was subdivided approximately in half with Ms. Twigg surveying the northern portion and Mr. Canzonieri the southern portion. In addition to the creek banks, dry areas within the channel were surveyed. Field transects were oriented parallel to the creek and, if possible, spaced 2-5 meters apart. Surface visibility along the creek banks was poor, less than 20% due to dense vegetation, mostly grasses. An approximately 850 feet long x 25 feet wide gravel access road borders part of the west bank. The opposite east bank/north bank is bordered by a 15 foot wide gravel access road and a dirt easement approximately 40-45 wide. The sharp curves of the channelized creek are characterized by reinforcing with Sackcrete. In addition, portions of the creek appear "patched" with Sackcrete. Several corrugated steel outfall pipes are present in Reach 4. Two 24-inch steel outfall pipes, each reinforced with concrete and Sackcrete, are present on the east/north bank. The first is located approximately 627 feet (191 meters) south of Montague Expressway, the second approximately 1,581 feet (481 meters) east of Montague Expressway.

Reach 5 - I-680 to Morrill Avenue [Figs. 6, 31-34]

Mr. Canzonieri walked the south bank while Ms. Twigg walked the north bank. Field transects were oriented parallel to the creek and spaced 2-5 meters apart. Surface visibility along the creek banks was poor, less than 20% of the surface due to dense vegetation, mostly grasses. Very little water was present in creek at the time of the survey. Reach 5 from the east side of I-680 to Cropley Avenue is completely channelized with concrete. A gravel access road 15-20 feet wide and 12-15 foot wide dirt easements and gravel easements obscure the surface on both side of the creek. Cropley Avenue to Morrill Avenue of Reach 5 is partially channelized with Sackcrete. A 15-20 foot wide gravel access road borders the creek banks.

Reach 6 - Morrill Avenue to Secondary Sedimentation Basin [Figs. 6, 35-37]

Mr. Canzonieri walked the south bank while Ms. Twigg walked the north bank. The basin is located south of Webley Court/San Jose Water District "Cropley Pump Station" property at 3150 Cropley Avenue,⁵⁴ west of Creekside Drive. Field transects were oriented parallel to the creek and spaced 2-5 meters apart. Surface visibility along the creek banks was poor, less than 10% of the surface observable, mainly due to the lack of exposed sediments. Morrill Avenue to approximately 726 feet east is channelized creek (Sackcrete and/or sandbags). In addition, a 15-foot wide gravel access road borders the creek banks.

53. The entire northern, north/south portion of *Reach 4 - Montague Expressway to I-680* and a minor part of the east/west portion is located within the City of Milpitas. The remainder of Reach 4 and Reaches 5-9 and Alternatives 1-2 are located in the City of San Jose.

54. Owner: San Jose Water Works, 374 W. Santa Clara Street, San Jose 95196 and 95113-1502.

Note: Culverted Sierra Creek terminates at the south side of Berryessa Creek just west of Morrill Avenue (not shown on USGS, shown on Project figures: Upper Berryessa Creek Proposed Bypass Box Culvert Alternatives and Reaches 0-9 schematic map).

Reach 7 - Secondary Sedimentation Basin to Croyley Avenue [Figs. 6, 38-42]

Mr. Canzonieri completed the field inventory along the north side of the creek and where possible within the creek bed, while Ms. Twigg surveyed the south side of the creek. Survey transects were oriented east to west parallel to the creek and spaced 2-5 meters apart and included the surrounding fields (sedimentation basin/fields) parallel to the creek. Surface visibility along the creek banks was fair to good, approximately 40-75%. Water was present along portions of the creek at the time of the survey. A 15-foot wide gravel access road parallels the creek for approximately 575 feet on the north side. A gravel road approximately 15 feet wide along the south side of the creek follows the length of the creek to Piedmont Road. A 12-inch flap gate stamped "Olympic Foundry Co. Seattle" is present within a 24-inch corrugated steel pipe encased in concrete and Sackcrete is located approximately 181 feet east (55 meters) from the western boundary of Reach 7, 910 feet (277 meters) east Morrill Avenue. In addition three concrete foundations and a former 8-inch steel pipe were observed within Berryessa Creek Park. The larger square shaped approximately 30 x 30 inch foundation sits on top of a concrete pile (post). The two other foundations are approximately 36 inches high x 20 inches wide and thick, each with a concave groove/half crescent that could have held a pipe. The creek is channelized at Piedmont Road.

Reach 8 - Croyley Avenue to Old Piedmont Cul de Sac [Figs. 6, 43-45]

Mr. Canzonieri walked the east side of the creek while Ms. Twigg walked the creek bed and portions of the west bank. The latter is located approximately 296 feet (90 meters) east of Piedmont Avenue. Field transects were oriented north to south parallel to the creek and spaced 2-5 meters apart. Surface visibility along the creek banks was good, approximately 75%. Water was not present in the creek at the time of the survey. The west bank of Reach 8 is extremely steep with only small areas available along the bank due to residential property fences that extend almost to the creek bank. A 20-foot wide gravel access road parallels the east side of the creek. A concrete box approximately 4 feet x 4 feet x 7 feet high and 6 inches thick was observed eroding out of the east creek bank approximately 295 feet (90 meters) south of Old Piedmont Road.

Reach 9 - Old Piedmont to Upper Project Boundary [Figs. 6, 46-49]

Mr. Canzonieri walked the east side of the creek, while Ms. Twigg walked the creek bed and portions of the west bank. Field transects were oriented north to south parallel to the creek and spaced 2-5 meters apart. Surface visibility along the creek banks was fair, approximately 50% and included an area of dense riparian vegetation at and in the vicinity of the northern terminus. No water was present in the creek at

the time of the survey. As in the case of Reach 8, the west bank was extremely steep with scant area in which to walk at the top due to residential property fences that extend almost to the creek bank. A 20 feet wide gravel access road runs along the east side of the creek. A Eucalyptus grove parallels both sides of the creek

The bridge over Berryessa Creek at Old Piedmont Road (Bridge #37C-706) includes a date of 1926. The bridge is deteriorated with obvious damage to the columns. In addition a fire damaged Spanish style residence and a wood barn with a corrugated steel roof are adjacent (south) of the project alignment. 1960-1970s Ranch style homes are present along the west side of Old Piedmont Road and both sides of Cropley Avenue. The west side also includes a former Ranch Complex with a Spanish Revival style residence, a style popular in the 1920-1930s, within approximately 100 feet of the creek and a wood barn with a corrugated style roof approximately 270 feet of the south of the creek. The house was partially destroyed by fire in 2004-2005 according to a local resident (name withheld) who now currently runs cattle and stores firewood on the 50-acre parcel.

CA-SCI-156 – Supplementary Review

A supplementary field review of prehistoric site CA-SCI-156 (P-43-000168) was conducted on January 26, 2008 by Mr. Canzonieri. No evidence of the resource, supposedly located at the Cropley Avenue and [Old] Piedmont Road Junction, was observed. This site, described as a single flake and two shells with some possible fire-affected rock, may have been putative - the result of slope wash from a prehistoric site or possibly, non cultural (Bergthold 1974/form). Visibility along the west side of the road was excellent, nearly 90%. The exposed soil consists of dark brown silty clay with imported gravel.

7.2C Bypass Alternatives 1 and 2 [Figs. 6, 37, 50]

Proposed Bypass Box Culvert Alternatives 1 and 2 proceed along Cropley Avenue; Alternative 1 from Reach 5 is entirely along Cropley Avenue, Alternative 2 from Reach 6/7 is at about the southern end of Wembley Court northeasterly to Cropley Avenue. No evidence of midden, artifacts, etc., was observed in the vicinity of CA-SCI-157 (P-43-000169), an "open ? artifact [not described] as mapped by the CHRIS/NWIC adjacent to Bypass Alternatives 1 and 2.

Bypass Alternative 1

Mr. Canzonieri and Ms. Twigg conducted a windshield survey of Bypass Alternative 1 which extends from Reach 5 on the west, approximately 660 feet (202 meters) west of Morrill Avenue east along Cropley Avenue to Reach 8 (located approximately 296 feet (90 meters) east of Piedmont Road). Alternatives 1 and 2 pass through an urban landscape, comprised of ca. 1960s residential and community buildings. Both the Church of Latter Day Saints at 3110 Cropley Avenue (south side) and Morrill Middle School at 1970 Cropley Avenue (north side) opposite are bounded by Morrill Avenue on the west.

Bypass Alternative 2

As noted above in the Bypass Alternative 1 survey summary, Mr. Canzonieri and Ms. Twigg conducted a windshield survey along Cropley Avenue. The shorter Bypass Alternative 2 extends northeasterly from Reach 6 through of the San Jose Water District [*sic*] "Cropley Pump Station" property at 3150 Cropley Avenue⁵⁵ and then along Cropley Avenue east to Reach 8. The westernmost portion of Alternative 2 is situated just south of a residential area between Wembley Court on the west and Creekside Drive on the east adjacent to the parcel occupied by the Water District. Lacking an entry/access permit to the Water District property, survey observations were limited to the periphery. The Water District property in the vicinity of the proposed Alternative 2 appears to be occupied by landscaping (e.g., eucalyptus streets) west of the building(s), storage tanks, and monitoring equipment.

7.3 SURVEY SUMMARY

- Recorded site CA-SCI-593 (P-43-000588) was relocated within Reach 3 and appears to be larger than as recorded.
- No evidence of prehistoric archaeological site CA-SCI-156 (P-43-000168), site/isolate CA-SCI-157 (P-43-000169), and/or reported cultural resource C-167, or, other prehistoric and/or historic era archaeological resources was observed during the field inventory.
- No potentially significant architectural resources were observed during the survey. The bridges/culverts at major points within the alignment are listed below from north to south/Reaches 1 to 9. Most lack bridge/culvert numbers and are not of historic importance.

Los Coches between Reaches 1 and 2: two-lane bridge, approximately 40 feet wide

Piedmont Creek between Reaches 2 and 3: wood girder type railroad trestle (bridge), 16 feet wide, 35 feet long

Yosemite Avenue within Reach 3: four-lane bridge, approximately 80 feet wide.

Ames Avenue within Reach 3: two-lane bridge, approximately 50 feet wide

Montague Expressway between Reaches 3 and 4: about nine-lane box culvert, approximately 142 feet wide

55. The Cropley Pump Station, "established in 1963" consists of an approximately 4.9 acre triangular parcel with a single driveway "exiting Cropley Avenue" with some asphalt paving providing vehicle access to water storage tank and pump station equipment, the equipment of two wireless service providers (Metro PCS, Cingular), as well as four wells, grasses trees, shrubs, and fencing (EarthTouch 2007/S-33859).

I-680 Reach 5: culvert/bridge, approximately 200 feet wide

Cropley Avenue: four-lane culvert, approximately 90 feet wide

Morrill Avenue between Reaches 5-6: two-lane culvert, approximately 90 feet wide

Piedmont Road between Reaches 7-8: culvert, four/six lane intersection, approximately 408 feet wide

Berryessa Creek at Old Piedmont: two-lane bridge, approximately 20 feet wide

Old Piedmont Road: two-lane bridge, approximately 20 feet wide; date of 1926 on bridge (Note: Bridge has a former bridge number painted over 37C-706; this number does not correspond to the current bridge location in the current Caltrans local bridge inventory)

8.0 RESULTS

This *Historic Property Survey Report/Finding of Effect* (HPSR/FOE) report for the Berryessa Creek Project, Cities of San José and Milpitas, Santa Clara County was prepared to identify historic properties which may be listed, determined or potentially eligible for inclusion on the National Register of Historic Places in or immediately adjacent to an alignment proposed for various flood channel improvements along an approximate four mile alignment of Berryessa Creek. The alignment extends from Calaveras Boulevard on the north, to the Montague Expressway on the south and then trends east to Old Piedmont Road.

- Thirty-one (31) cultural resources compliance reports on file at the CHRIS/NWIC include part of the proposed project. These reports have been produced for various channel improvement projects for the Santa Clara Valley Water District (SCVWD) and U.S. Army Corps of Engineers (Sacramento District), the South Bay Water Recycling Program, Berryessa Creek Park, private development, city infrastructure, and a general plan. Four other known reports not on file at the CHRIS/NWIC include the project alignment or report on Native American burial(s) at CA-SCI-593 (P-43-000588).
- Four prehistoric cultural resources have been reported within or adjacent to the alignment: (1) CA-SCI-156 (P-43-000168); (2) CA-SCI-157 (P-43-000169); (3) CA-SCI-593 (P-43-000588); and, (4) C-167.
- No Native American villages, traditional or contemporary use areas or other features of significance have been identified in or adjacent to the proposed project.
- No known Hispanic Period dwellings or other structures have been reported in or adjacent to the proposed project alignments.
- No American Period archaeological sites have been recorded or reported in or adjacent to the proposed project.

- One previously recorded prehistoric archaeological site, CA-SCI-593 (P-43-000588), was relocated during the field survey. No evidence of other previously recorded resources or additional prehistoric or historic archaeological resources was observed.
- No buildings are located in or immediately adjacent to the proposed alignment. No local, state or federal architecturally significant structures, landmarks, or points of interest have been identified within or adjacent to the project either through archival research or the field inventory.
- No local, state or federal cultural resources/historic properties, landmarks, points of interest, including properties eligible for the National Register of Historic Places or the California Register of Historical Resources have been recorded, reported, identified or observed in or adjacent to the project.
- One historic property within and adjacent to the alignment, prehistoric site CA-SCI-593 (P-43-000588), appears eligible for inclusion on the National Register of Historic Places under criterion d as result of archival research and various field inventories.
- Archaeological and geoarchaeological data suggest a moderate to high potential for exposing subsurface archaeological materials within the flood control project alignment and adjacent areas in Reach 3 during the proposed construction near CA-SCI-593 (P-43-000588). This conclusion is based on the presence of a recorded prehistoric archaeological site that has yielded Native American burials and whose boundaries are not yet defined.

9.0 RECOMMENDATIONS

The reasonable and good faith effort to identify archaeological resources within the project alignment included a systematic field inventory. One previously recorded prehistoric archaeological site that appears eligible for the National Register of Historic Places under criterion d is present within and adjacent to the project alignment in Reach 3. The horizontal and vertical extent of CA-SCI-593 (P-43-000588) is not known. It is probable that the resource includes a larger portion of the Berryessa Creek channel and extends into the surrounding area east of the present channel. Presence/absence testing is recommended prior to construction to determine the horizontal and vertical extent of the site and provide an indication of site integrity. This action will supplement the current identification and evaluation effort and allow the Corps and its local partner to consider redesign and/or plan for future construction impacts.

10.0 FINDING OF EFFECT

The Corps has made a reasonable and good faith effort to identify historic properties listed, determined, or potentially eligible for inclusion on the National Register of Historic Places (36 CFR Part 800.4) within or immediately adjacent the project's APE pursuant to the NHPA of 1966 (as amended) (16 U.S.C., Section 470f) and its implementing regulations 36 CFR Part 800. The identification effort included a records

search, literature review, consultation with the Native American Heritage Commission, and a field inventory.

One archaeological resource within and adjacent to the project alignment appears eligible for the National Register of Historic Places under criterion d. The regulations implementing Section 106 of the NHPA define an effect as any action that would alter the characteristics of the property that may qualify the property for inclusion in the National Register of Historic Places, and, diminish the integrity of a property's location, setting, design, materials, workmanship, feeling or association (36 CFR Part 800.5(a)(1-2)). A finding of *Historic properties affected* (36 CFR Part 800.4(d)(2) is appropriate since the proposed undertaking may adversely affect a historic property listed, determined eligible or potentially eligible for the National Register of Historic Places.

11.0 MITIGATION MEASURES

The proposed project has not yet been designed. It is expected that a *Memorandum of Agreement* between the U.S. Army Corps of Engineers (Sacramento District) and their local partner the Santa Clara Valley Water District and the State Historic Preservation Officer will be developed and negotiated to resolve any adverse effects to the National Register of Historic Places eligible resource in accordance with 36 CFR Part 800.6.

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Abbreviations

| | | | |
|------|--------------------|------|-----------------------------|
| n.d. | no date | v.d. | various dates |
| N.P. | no publisher noted | n.p. | no place of publisher noted |

The abbreviated phrase "CHRIS/NWIC, Sonoma State University, Rohnert Park" is used for material on file at the California Historical Resources Information System, Northwest Information Center, California State University Sonoma, Rohnert Park.

ATTACHMENTS

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| FIGURE 48 | Reach 9 north along creek |
| FIGURE 49 | Reach 9 south along creek at terminus for reach |
| FIGURE 50 | Alternative Route west along Cropley Road from Piedmont Road |

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CORRESPONDENCE

| | |
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| LETTER | REQUEST TO NATIVE AMERICAN HERITAGE COMMISSION |
| LETTER | NATIVE AMERICAN HERITAGE COMMISSION RESPONSE |

CHRIS/NWIC SEARCH RESULTS

| | |
|--------|--|
| SEARCH | File No. 08-0825 dated February 25, 2009 |
|--------|--|

SITE FORMS AND CARDS

| | |
|--------|---|
| FORM 1 | CA-SCI-156 (P-43-000168) |
| FORM 2 | CA-SCI-157 (P-43-000169) |
| FORM 3 | CA-SCI-593 (P-43-000588) [Includes recent aerial photo with probable burial location; S-4296, S-8115, Cartier and Felippo 1987; Cartier and Filippo 1988; S-15929, S-15947] |
| FORM 4 | P-43-001136, Berryessa Creek Reburial location |
| CARD 1 | C-167, midden deposit; in/adjacent, may be part of CA-SCI-593 |

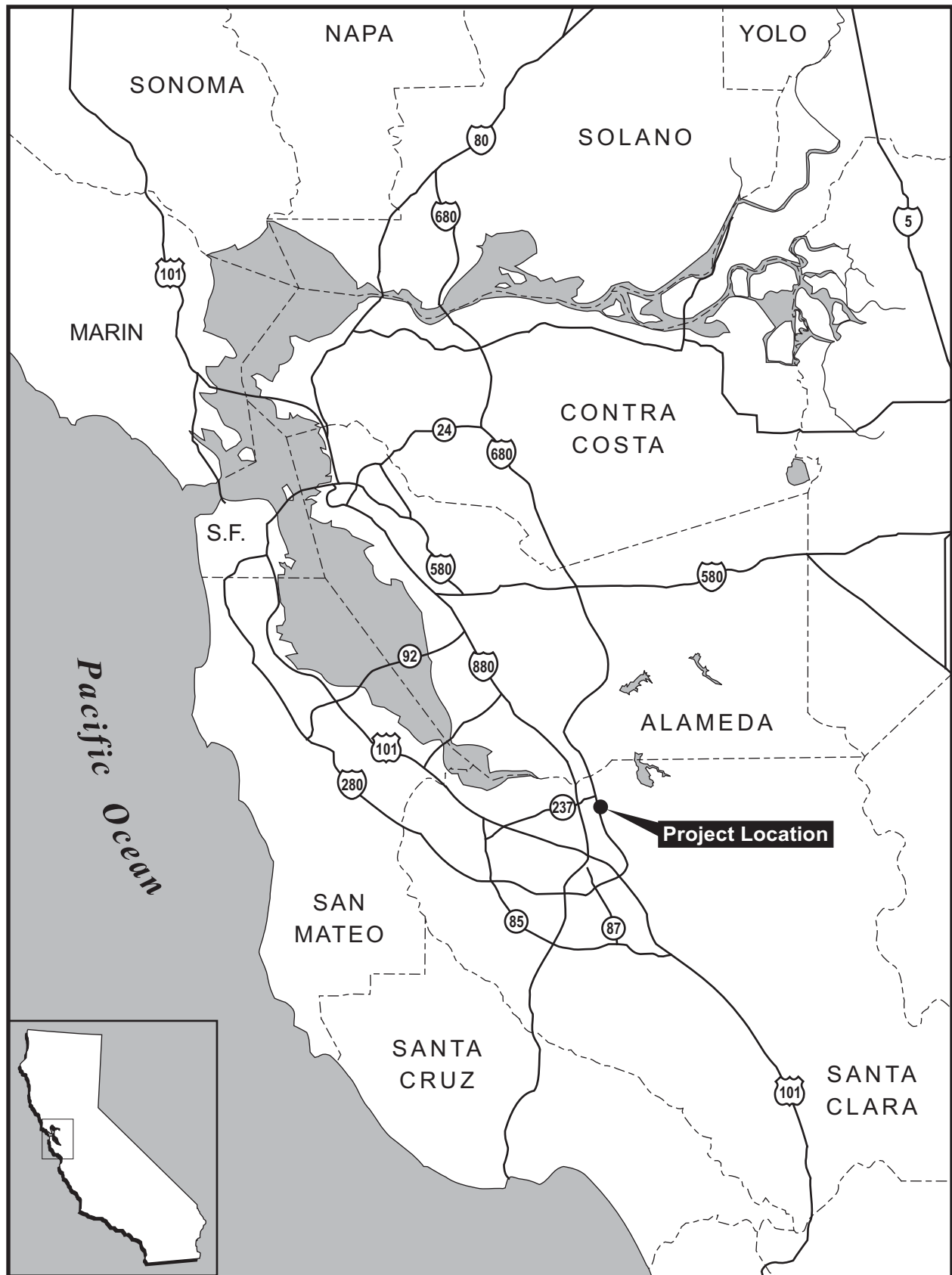


Figure 1: General Project Location

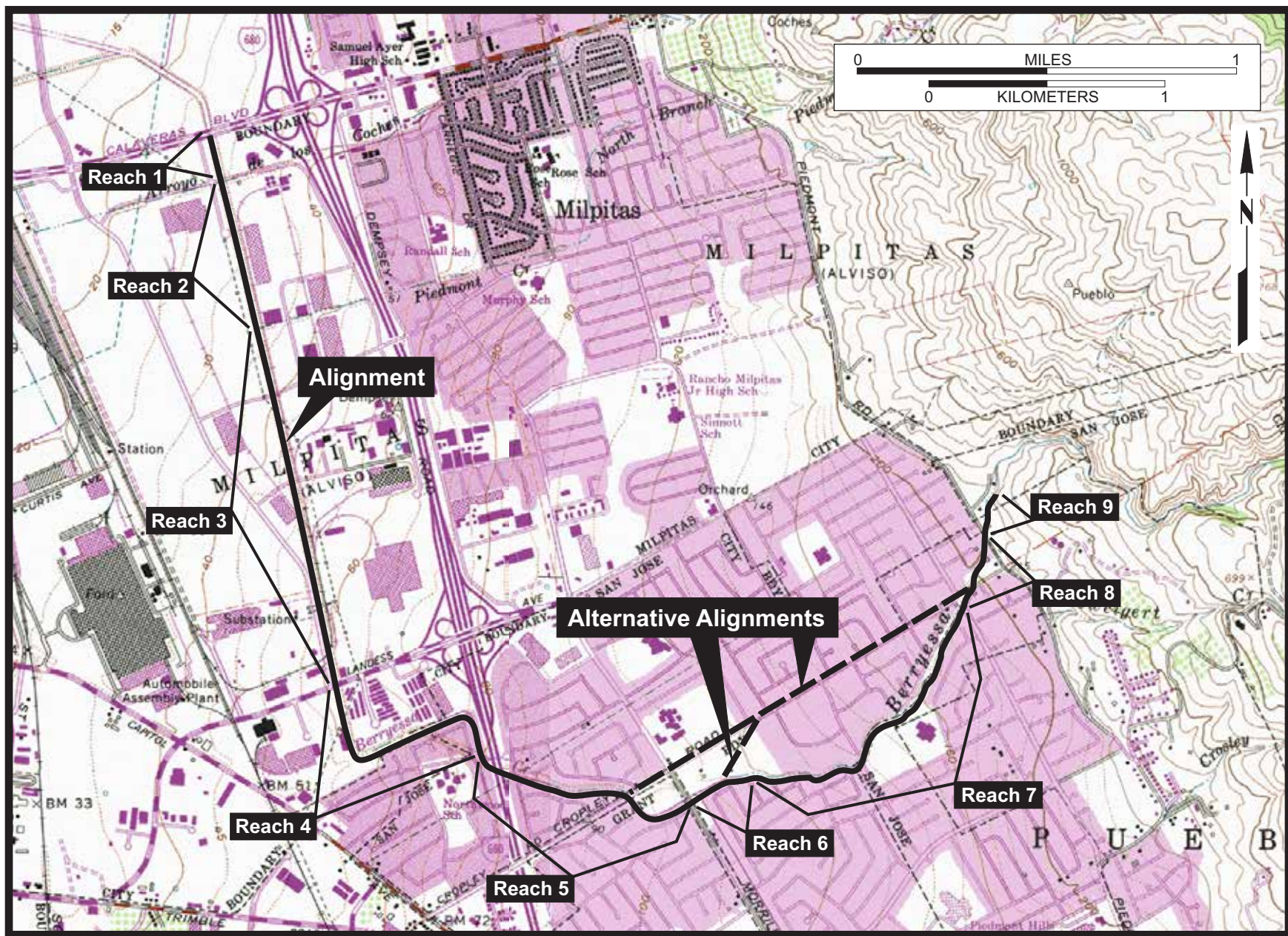
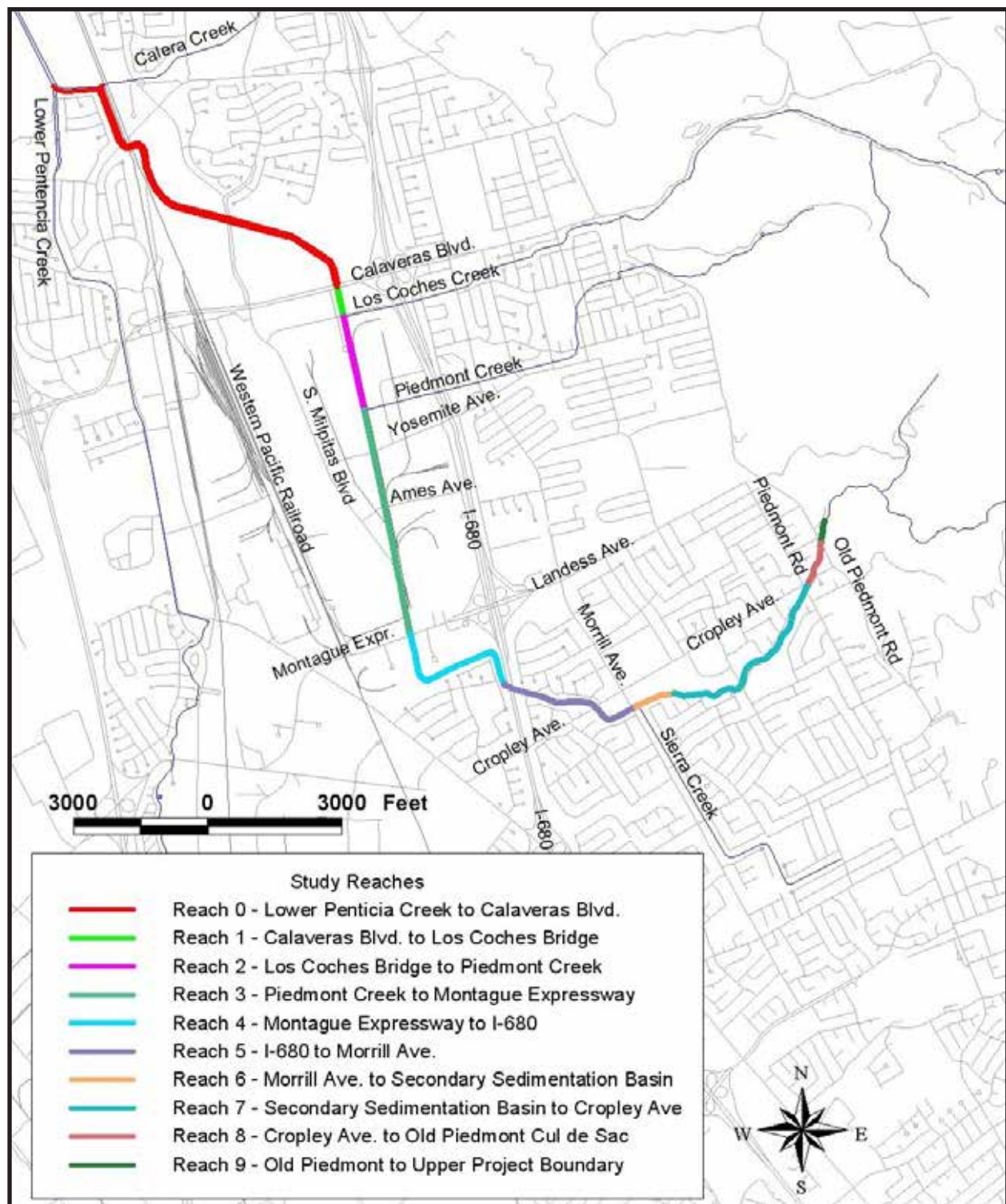


Figure 2: Project Location (USGS Milpitas, Calif. 1980 and Calaveras Reservoir, Calif. 1980)



* The Berryessa GRR does not include Reach 0*

Figure 3: Study Reaches

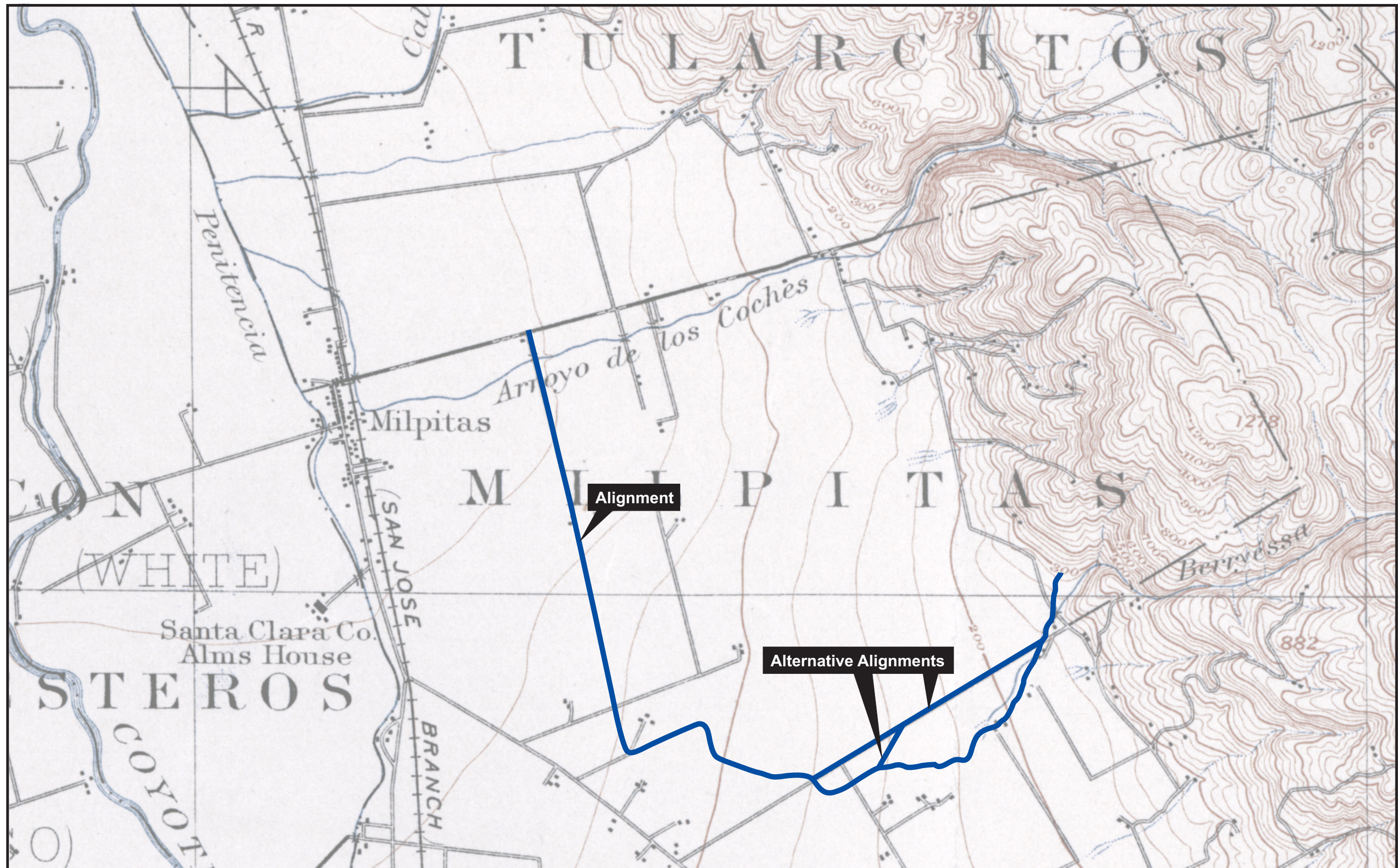


Figure 4: Project Location in 1899 (USGS San Jose, Calif. 1899)

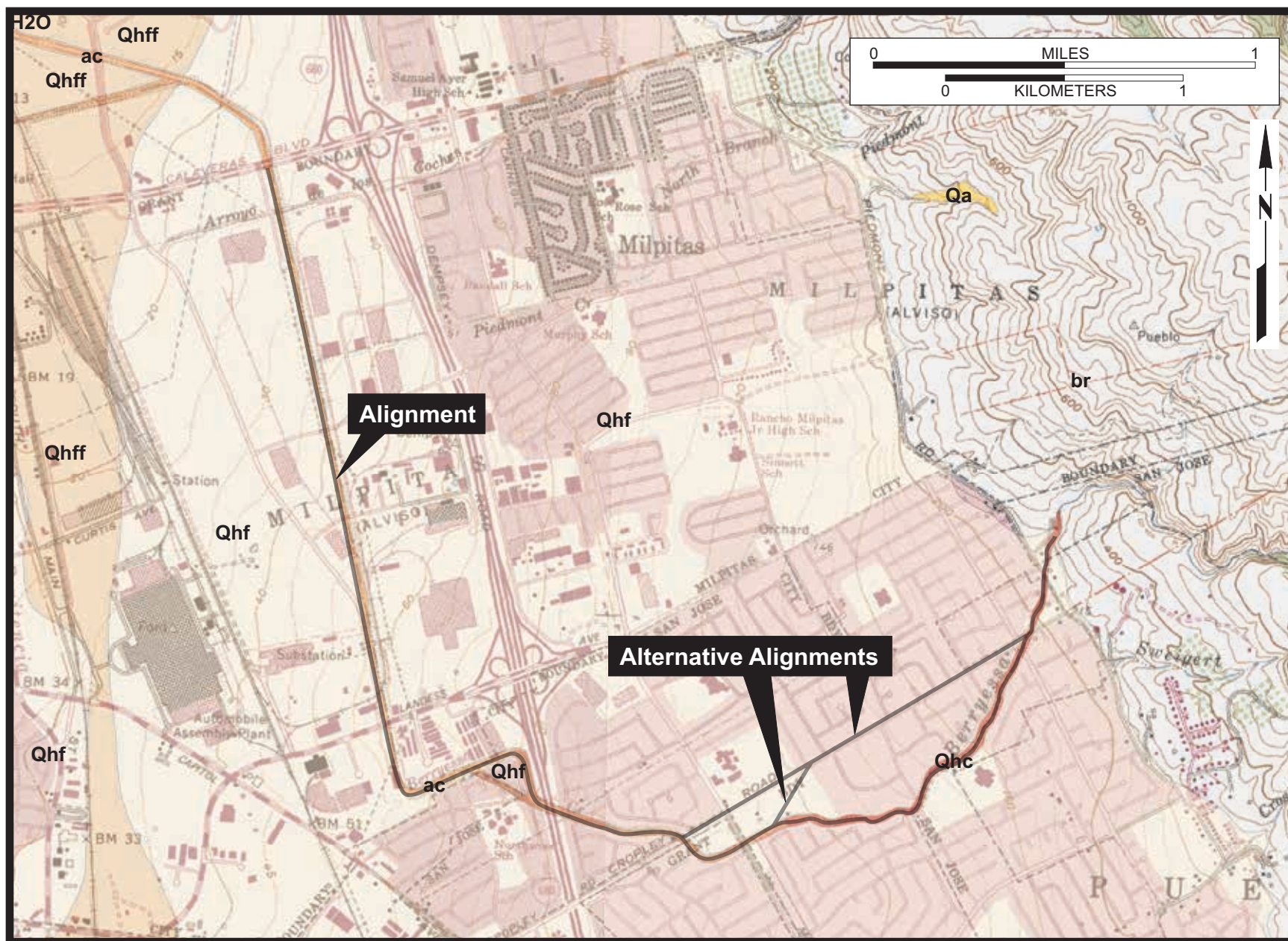


Figure 5: Project Alignments with Quaternary Deposits (Witter et al. 2006)



Figure 7: Reach 1 south along west bank from Calaveras Road towards Los Coches Street

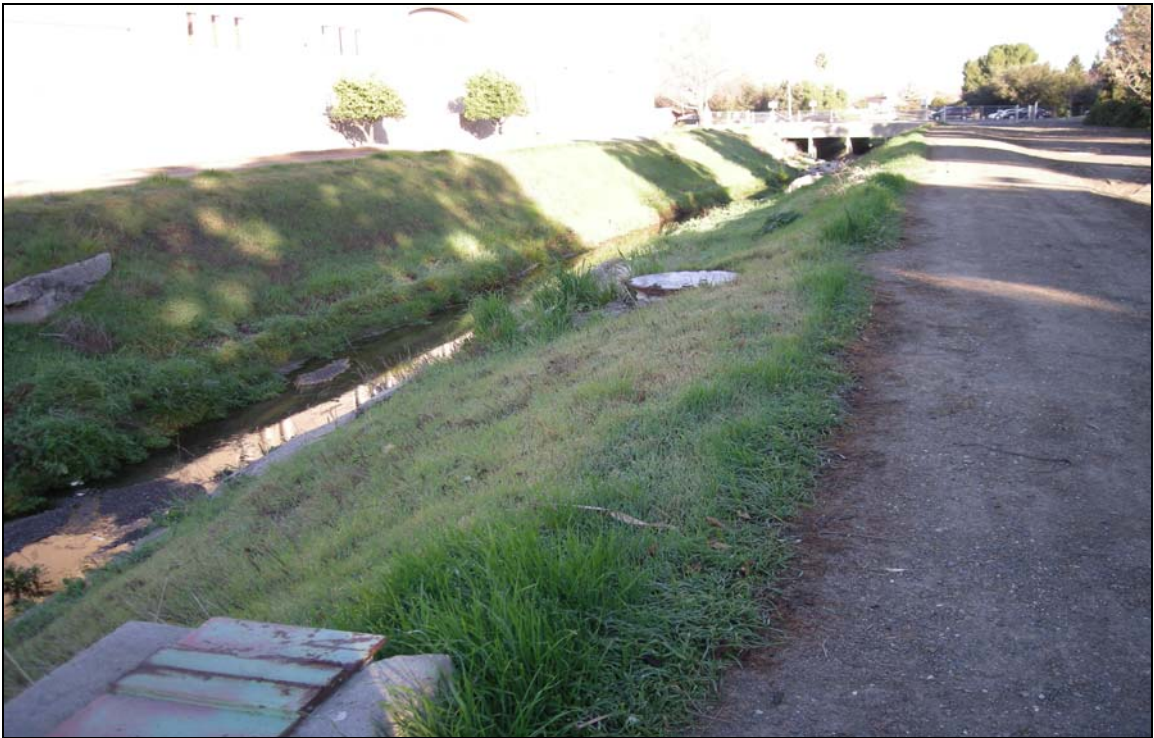


Figure 8: Reach 1 north along east bank from Los Coches Street towards Calaveras Road



Figure 9: Reach 1 RCP outfall with rip-rap on east bank



Figure 10: Reach 1 View of the west bank just north of Los Coches Street



Figure 11: Reach 2 south along the west bank



Figure 12: Reach 2 south along the west bank



Figure 13: Reach 2 north along the west bank



Figure 14: Reaches 2 and 3 east towards Piedmont Creek and railroad trestle



Figure 15: Reaches 2 and 3 view west from east side of railroad trestle over Piedmont Creek



Figure 16: Reaches 2 and 3 close view of railroad trestle over Piedmont Creek



Figure 17: Reach 3 south along the west bank towards Yosemite Avenue



Figure 18: Reach 3 erosion along the east bank just south of Yosemite Avenue bridge



Figure 19: Reach 3 south along the east bank



Figure 20: Reach 3 north along the west bank from Yosemite Drive



Figure 21: Reach 3 south along west bank towards modern railroad trestle



Figure 22: Reach 3 north towards Ames Avenue



Figure 23: Reach 3 north towards CA-SCI-593



Figure 24: Reach 3 east bank erosion and exposure of CA-SCI-593



Figure 25: Reach 3 – CA-SCI-593 *Cerithidea californica* in east bank



Figure 26: Reach 3 north towards railroad trestle and CA-SCI-593



Figure 27: Reach 4 north towards Montague Expressway



Figure 28: Reach 4 west along the north bank



Figure 29: Reach 4 north along the creek parallel to Interstate 680



Figure 30: Reach 4 north from the terminus of Reach 4 adjacent to Interstate 680



Figure 31: Reach 5 north from Cropley Avenue towards Interstate 680



Figure 32: Reach 5 Sackcrete along creek bank and creek floor south of Cropley Avenue



Figure 33: Reach 5 west towards Cropley Avenue



Figure 34: Reach 5 east towards Morrill Avenue



Figure 35: Reach 6 east from Morrill Avenue, south bank and culvert



Figure 36: Reach 6 east from Morrill Avenue east of culvert



Figure 37: Reach 6 northwest towards Alternative Route



Figure 38: Reach 7 east along creek and banks



Figure 39: Reach 7 east along creek within Berryessa Creek Park



Figure 40: Reach 7 concrete foundation, south bank within Berryessa Creek Park



Figure 41: Reach 7 south along the west bank



Figure 42: Reach 7 north towards Piedmont Road



Figure 43: Reach 8 south along the east side of the creek from Old Piedmont Road



Figure 44: Reach 8 south along creek; concrete vault on east bank



Figure 45: Reach 8 south along creek



Figure 46: Reach 9 – view north of former County Bridge 37C-706



Figure 47: Reach 9 Eucalyptus Grove



Figure 48: Reach 9 north along creek



Figure 49: Reach 9 south along creek at terminus for reach



Figure 50: Alternative Route west along Cropley Road from Piedmont Road